

Contents January, 1917

Vol. XIX

No. 1



Elithro II, a
Luders - designed
and built express
cruiser, powered with
a Duesenberg motor and
owned by John Kelley Robin-
son, of New York City

Motor Boats as Naval Scouts.....	7-8	The Prize Contest in Questions and Answers:	
One-Hundred-Mile Speed for Nine Hours.....	7-8	High Speed vs. Heavy Duty.....	26-27
Winter Racing in Florida.....	11-12	A Place for Your Shore Clothes.....	27-28
Practical Wireless for Motor Boats (Part V).....	13-14	The Boarding Steps.....	29-30
Finding the Compass Error.....	15	American Marine Motors:	
Motor Boating in the Jungle.....	16-17	The 1917 40 H.P. Erd.....	31
Lubrication in Its Various Phases (Part II).....	18-19	New Van Blerck Shows Improvements.....	31
Martha II	20	The Largest Aeronautic Motor.....	32
* A New Squadron Cruiser.....	21-22	A 200 H.P. Wolverine Kerosene Motor.....	32
One of New York's Defenders.....	23	Spark Plugs for American Marine Motors.....	33-35
A South Shore Fishing Cruiser.....	24	New Things for Motor Boatmen.....	36
The Fuel Problem Solved.....	25	MoToR BoatinG Makes Important Announcements.....	37
		Yard and Shop.....	38-39

January, 1917

**MOTOR
BOATING**

Vol. XIX, No. 1

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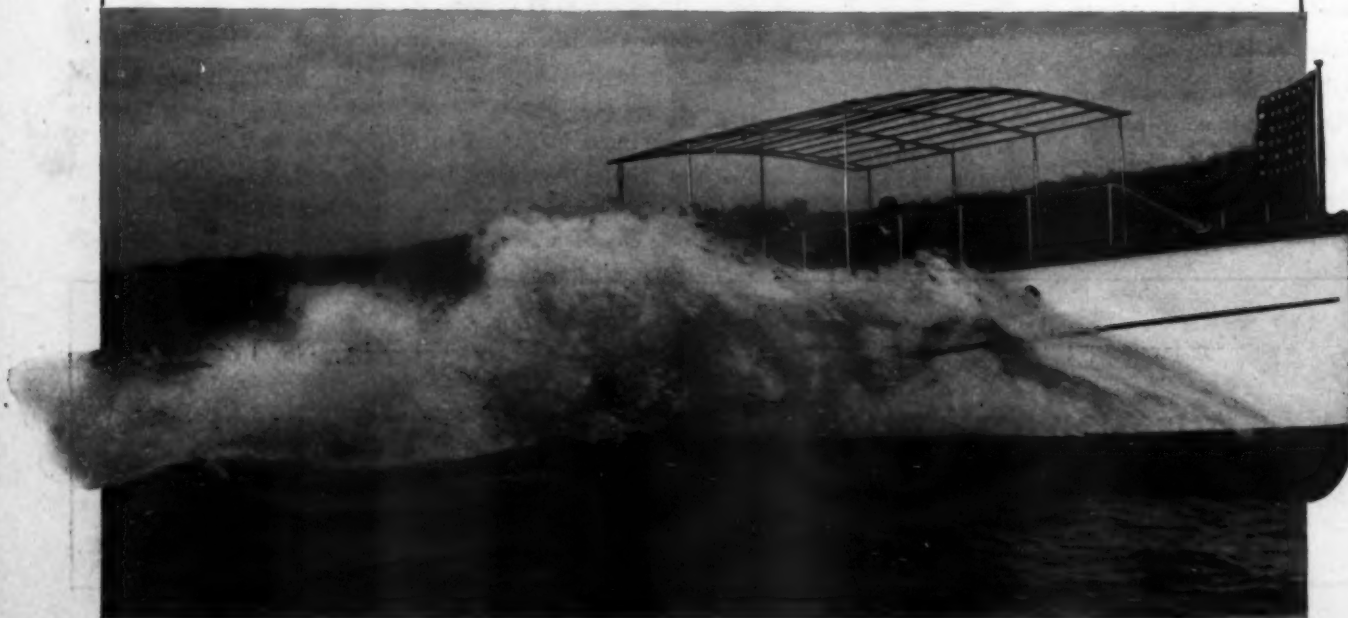
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THE NATIONAL MAGAZINE OF MOTOR BOATING

Vision, the new 45-foot express cruiser owned by Thomas B. Taylor, of New York City, is of a type which might be accepted by the Navy Department. In first cost this boat represents an expenditure of about \$12,000 and for operation at full speed \$20 an hour is a conservative figure

Motor Boats as Naval Scouts

The Design and Speed of the Craft Not Always as Important as the Nautical Knowledge, Skill and Resourcefulness of Its Commander

By E. K. Roden

WITH the advent of the motor boat as an important acquisition to our national defense, motor boating can no longer be looked upon merely as an exhilarative pastime. Its affiliation with military and naval forces guarding our extensive coast lines has placed motor boating upon a basis where responsibility and serious work go first, with sport and pleasure as a secondary consideration. This being the case, it becomes the duty of owners and operators of motor craft enrolled for defense service to acquire and cultivate not only a thorough understanding of the handling of the boat and engine, but also a knowledge of various wrinkles which in time of actual service may prove of value. The following suggestions apply in particular to a motor unit assigned to scout duty which through unforeseen exigencies may find itself in strange waters and, therefore, will have to rely upon the skill and resourcefulness of its commander to carry out his scout work and at the same time avoid the pitfalls likely to be encountered in navigating unknown sections of the coast.

INDICATIONS OF SHALLOW WATER

Upon approaching a shoal spot in the water, the attention of an observer will be attracted either by a rise in the height of the waves, with a tendency to curve over and break, or by their taking on a troubled, agitated appearance, in marked contrast to the waves in deeper water. The extent of the irregular water will, in most cases, clearly define the limits of the shoal, and, when traversing shoal places, the deepest water will always be found where the waves are of normal size and most regular appearance. They will be clearly distinguished from either the lifting kind, which are inclined to topple and break, or the

smaller jumbled type. At times, the water over the shoal will be smooth and the water in the channels ruffled; this is particularly likely to be the case when the shoal bordering the channel has a growth of weeds reaching nearly to the surface.

If in strange waters and a line of ripples stretches across the course, the ripples should be approached with caution. The line may be caused by the changing of the tide, or it may be a reef or bar fairly close below the surface. These small ripples are often seen along the edge of shoals when the surrounding water is smooth, particularly when the outside water is deep; they are caused by the flow of the tide being shunted off by the shoal. During a strong breeze, when traversing a shoal having from 3 to 20 feet depth of water over it, the deeper parts may invariably be distinguished by watching for the heavier, more regular waves, while the shallow spots of the shoal are indicated by choppy, breaking waves.

CROSSING A BAR

Necessity may at times compel the passage of a boat through a reef or a bar, over which a strong sea is running. In such cases it is well to run slowly along the reef at a moderate distance and search carefully for regular waves. If there is an opening, or channel, through, it will show water distinctly different from that over the rest. In such deep places, the water will remain without breaking until the sea has attained such violence that even the deep places have practically become shoals. The passage through comparatively unknown reefs and bars when heavy weather prevails should not be attempted except by the most experienced men. The sea may look smooth and regular at some distance off the bar, but on approaching, the conditions

may be such as to require an intuitive skill at the helm to get the boat safely through.

WAVE MOTION

To run smoothly, a wave requires a depth of water as great as is the distance from its own trough to trough. If that distance is 15 feet, the wave requires 15 feet of water to roll in or it will begin to rise in height and form a crest, this being the result of the friction of the wave motion on the bottom. It is the wave motion that travels, not the water, as can be readily seen by dropping a colored liquid of any kind into the sea—the color will remain stationary, or nearly so, while the motion of the wave will continue to advance.

When running along a beach at night, the beach being free from rocks, the line of safety can be felt by the lifting of the boat; if too close in, a sharp lift will be felt when a sea passes under—the motion being distinctly different from that felt when the boat was in deep water—and it is a sure indication that the boat is within the line where the wave begins to top the breaker. In a heavy on-shore wind, the best traveling will be found a mile or more off-shore. The reason is that heavy seas on striking a beach or a reef give a strong recoil that causes a series of opposing waves which, meeting those coming in, produce rough, irregular water.

Occasionally there will be seen a solitary lift or leap of the water where there are no other evidences of disturbances; this is generally caused by a small mound or boulder arising at that spot from the bottom.

TIDE RIPS

Tide rips are the result of strong currents. With no visible signs of disturbance and the sea smooth all about them waves of this character will rear and tumble. They are clearly distinct from anything about them, and do not take one unawares. Almost invariably they have white foaming crests and roar in an unmistakable manner. Even in a white-cap breeze, they are clearly whiter than anything about them, and are so definitely marked that one can sail down their edges and admire the wildness of the scene. The wave motion in them is short and steep. When wind increases their turbulence, none but the staunchest of boats and best of helmsmen should attempt to enter the turmoil. When compelled to encounter them in bad weather the boat should be kept to the edges, where the water is always deep. If in the rip and it is running

The 45-foot motor boat owned by the Navy Department and built according to its approved plans. Our Government urges owners to build craft from the same plans

strong (which is generally the case during four hours out of the six), the boat should be kept head-to; she will lift and pound badly, and perhaps get strained, but that is better than the risk of rolling over. At the slack of the tide the rips do not exist.

HEAD SEA

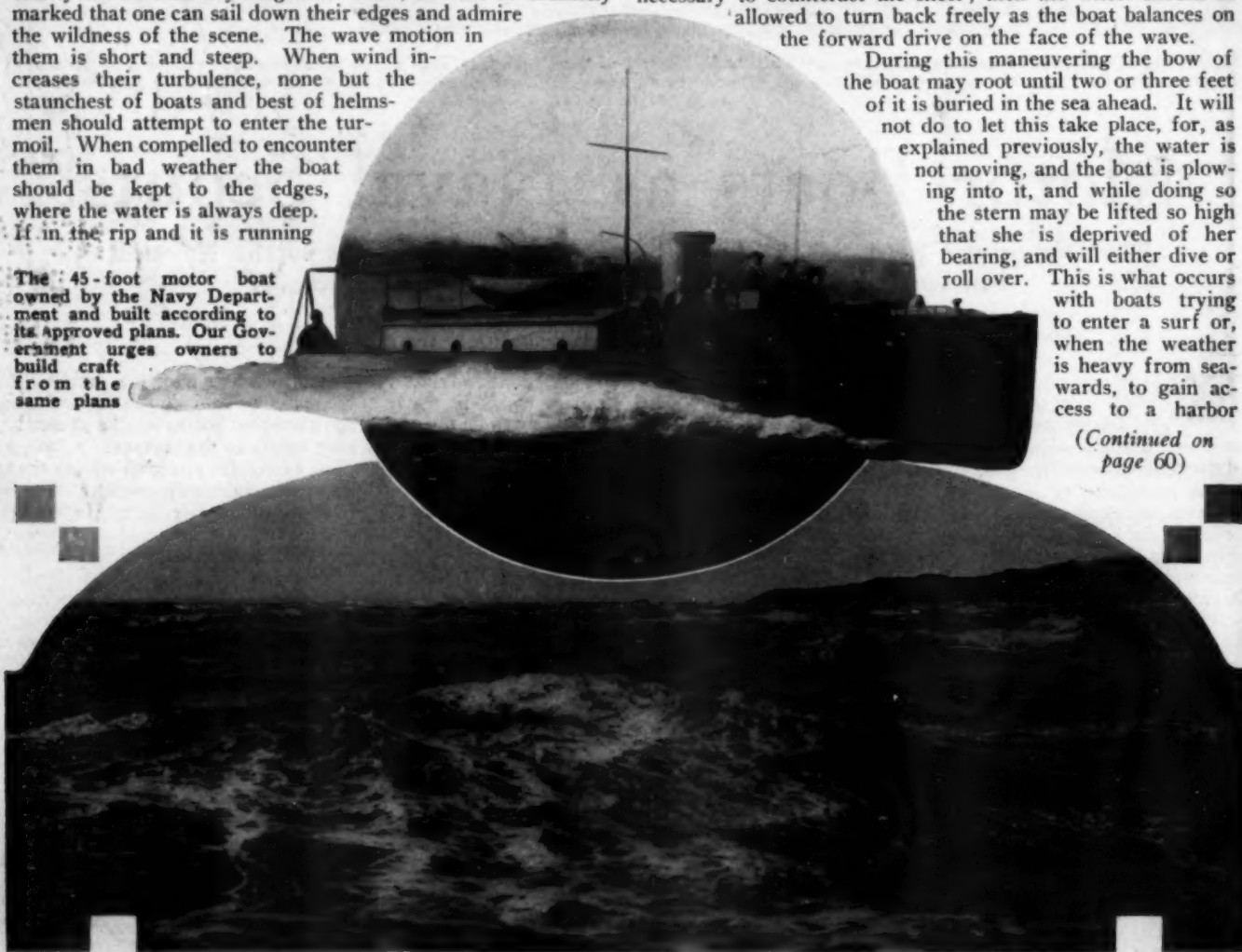
During a hard blow, the sea will be found to present waves that are regular in general, but interspersed with seas that are too sharp for comfort for a boat of light construction. If going to windward, many of these seas will compel one to head into them; then will come a lift and, if the boat has not a sharp V-section forward, a smashing fall down the back of the wave. These falls pound the bottom of a boat so severely that it is not good practice to permit many of them. They are avoided by turning the boat a trifle off the wave, though if the swell is steep enough to throw the boat there is no help but to take it head on. Should swinging her off, to give more bearing surface, take the boat too much off the course, the remedy is to take the seas on one bow for a stated time and then on the other for the same interval—the result being an equalization of the course.

FOLLOWING SEA

In running with a following sea the helmsman meets his hardest task. When a sea passes under the boat, lifting the bow, the next wave comes under the stern and begins to lift, and when the stern has been raised to a greater height than the bow, the latter begins to root—which means that the boat is "down by the head," and does not respond to the rudder. This is the anxious moment for the helmsman, as he waits for the feeling coming with a submerged rudder that indicates the direction in which the bow is going to turn. So long as the rudder is out of water it should be kept steady by the wheel, and the instant the feeling comes that it is submerged the helm should be turned, gently at first, then with all the strength necessary to counteract the sheer; then the wheel should be allowed to turn back freely as the boat balances on the forward drive on the face of the wave.

During this maneuvering the bow of the boat may root until two or three feet of it is buried in the sea ahead. It will not do to let this take place, for, as explained previously, the water is not moving, and the boat is plowing into it, and while doing so the stern may be lifted so high that she is deprived of her bearing, and will either dive or roll over. This is what occurs with boats trying to enter a surf or, when the weather is heavy from seawards, to gain access to a harbor

(Continued on page 60)



A tide rip. To navigate a body of water like this requires caution and skill. Tide rips are the result of currents and are worse when the wind is blowing in the opposite direction from that of the current

One-Hundred-Mile Speed for Nine Hours

The Express Time for the Chicago-New York Run Cut in Half—The Immense Possibilities of the Aeroplane Emphasized by the Recent Record-Breaking Flight

By Ruth Bancroft Law

Champion Long Distance Flyer of America

FLYING is really easy, in every way as easy as automobiling, but much more intensive and thrilling. While I had made hundreds of flights in the past four years, I had never flown more than twenty-five miles across country. Having concluded the exhibition flying season, I decided to make a flight from Chicago to New York, which is about 884 miles by air line, and try to break Victor Carlstrom's record, using my small biplane, which has a wing spread of 28 feet, and is equipped with a 100 h.p. motor. The tank carried only sixteen gallons of gasoline and so I had another tank fitted in that brought the fuel capacity

up to fifty-three gallons; that was half enough for the flight of about 900 miles from Chicago to New York. Even that crowded the little plane so that all the extra clothing I could take along was one skirt. How that skirt proved to be most convenient I shall explain later.

I was up Sunday morning, November 19, before 5 o'clock, Central time. I ate a light breakfast, and then put on my flying suit—or suits, to be exact. First there was a woolen suit, then another woolen suit, then a leather flying suit, and over all a second leather suit. I wore a helmet of leather and wool, with a

and then turned toward Cleveland, going up to 3,000, 4,000 and then 5,000 feet. I had with me a barograph, an aneroid, a compass, and a clock, as well as my speedometer. I had left the lights behind, because I thought they would be in the way. I did not keep close track of the time, but noticed that I was making about 100 miles an hour consistently a short time after leaving Chicago. When I started there had been a southwest wind of about 26 miles an hour, but this soon died out, and there was almost no wind.

I passed over Cleveland, with everything going nicely, at a height of about 6,000 feet. I couldn't see whether there were many people watching me, and I suppose there were not, because my flight hadn't been much advertised. The little machine, which had never before done anything more than such stunts as looping-the-loop, was doing all that could possibly be asked of it.



Miss Law in her seat aboard the machine in which she made the flight from Chicago to New York City, and Mr. Woodhouse, of the Aero Club of America

face mask of wool and goggles. Then I went to Grant Park, on the shore of Lake Michigan, with my manager. We got there at about 6 o'clock. The machine was pulled out, water and gasoline were put in, and we tried to start the engine, for I had planned to leave at 6:30, Central time. But it was so cold that we could not get the engine to run. The temperature was freezing and the air and gasoline would not mix together in the carbureter. To make this part of the story short, it was 7:20 before we got the engine running. Mr. Stevens, a representative of the Aero Club, was with us all the time.

I took off the skirt I had been wearing over my flying suit, stored it behind the seat, got in, and was off, at 7:25. The dozen people in Grant Park cheered me as I started, flying low, south over Chicago. I skimmed over the city, flying about 200 feet up, for about 26 miles,

A slight shift in the course, and I was headed for Erie, which I passed at an elevation of 3,000 feet. When I passed Erie I thought of Carlstrom and the loosened gasoline pipe that had forced him to stop. To guard against such a mishap I had equipped my machine with ordinary rubber gas pipe, which couldn't jar loose if it tried. When I steered due east from Erie to Olean, I knew I had beaten Carlstrom's record, and had established a new American record.

As I passed over Olean I began to remember that it was time for luncheon, and I did not have a thing to eat. I hadn't brought anything, because I didn't have room in the machine. But I comforted myself with the thought that I would get something to eat at Hornell, where I had planned to stop for gasoline.

I arrived at Hornell, N. Y., at 2:10, Eastern time, having covered the 512 miles in five

Augustus Post, one-time balloon champion, but now a flying enthusiast, welcomes Miss Law on her arrival at New York

hours and forty-five minutes. It took me an hour and fourteen minutes to get the gasoline, eat lunch, and start out again for Binghamton, where I arrived at 4:20 p. m. and stayed for the night.

My flight was made entirely by chart and compass. I prepared the chart myself by piecing maps together and marking the route and compass directions on them. The compass used is a rather large one brought from England in 1914 for Lieut. John C. Porte to make the transatlantic flight.

I left Binghamton the following morning at 7:23. The wind was blowing briskly, but it didn't do me any good. I soon found myself in a fog so thick that I couldn't make out where I was going. I had mapped out my course with the directions marked, but I had no instrument to indicate the drift the wind was imposing, and I couldn't see any landmarks. And so I came down until I was just topping the hills, and kept as close to the ground as I could. In fact, it was like coasting up and down the hills. I picked up the Susquehanna River and followed it, for, you know, an aviator can see the water when nothing else below is visible.

When I got to where the Susquehanna

service and only one dirigible and four or five observation balloons ordered.

We need, in round figures, about 2,000 aeroplanes, twenty-five dirigibles and 150 observation balloons to make this country seventh in aeronautic equipment for national defense.

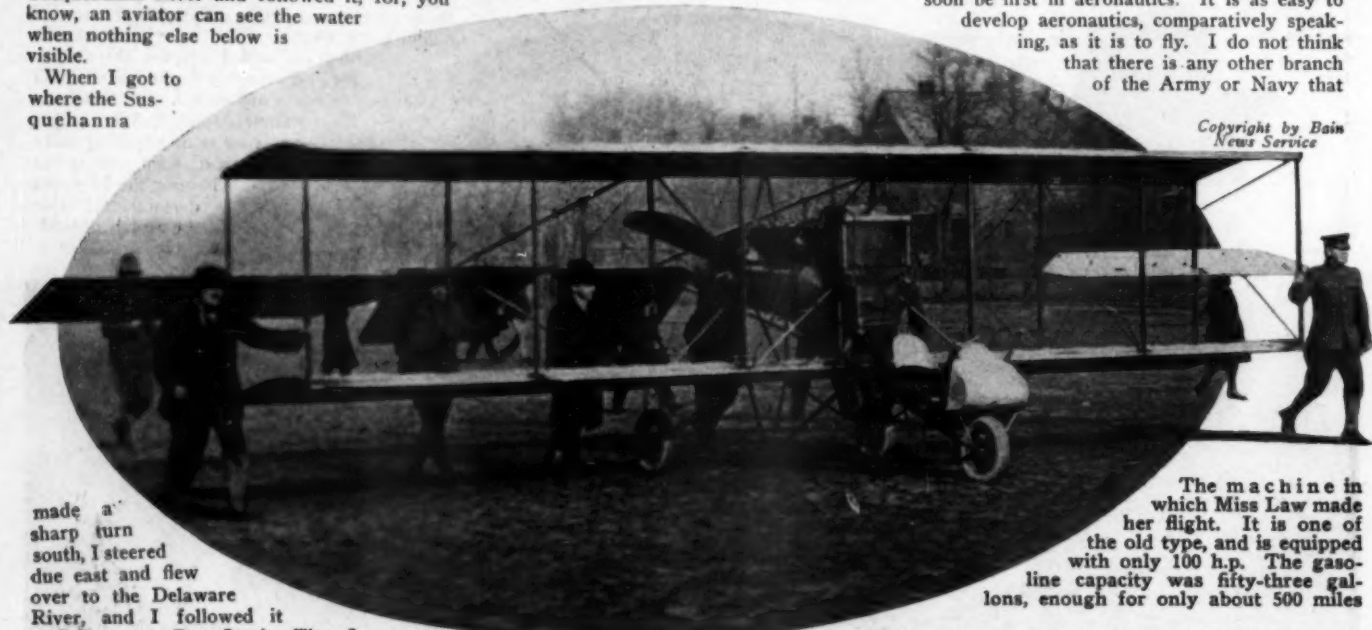
We need seventeen aero squadrons, of twelve aviators and thirty-six aeroplanes each (so as to have an aeroplane in service and two in reserve); and 127 kite balloons and six dirigibles to supply the aeronautic auxiliaries for the forty-five batteries of field artillery and the seventy-three forts in the six coast artillery districts. These batteries and forts are now blind, as it were, and the territory which they should protect would be at the mercy of the long-range guns of vessels lying beyond the point of vision of the artillery observers stationed in the forts. Hundreds of millions of dollars are invested in the coast defenses and field artillery which would be ineffective without the aerial auxiliary.

Our Army has only four aeronautic stations—at San Diego, Mineola, Chicago and

to aeronautics by civilians in this country than in any other country; we have 19,000,000 young men of military age, the majority of whom, if a vote were taken, would be shown to wish to take up aviation. And there is no gainsaying that we have more ingenuity and spirit of enterprise here than anywhere else."

I agree with him heartily. So will anyone who considers the subject seriously. It is a shameful thing to have allowed the country of Langley, the Wrights, Curtiss, and other pioneers to lag behind even the third-class powers, and the Aero Club of America and other organizations and individuals who have been working to make America first in this wonderful new art and science and were instrumental in making Congress appropriate close to \$18,000,000 in the past year for aerial defense have rendered a valuable service to this country.

In my four years of flying I have visited every part of this country. I have found great interest in flying everywhere, and if something is done to arouse public interest, America will soon be first in aeronautics. It is as easy to develop aeronautics, comparatively speaking, as it is to fly. I do not think that there is any other branch of the Army or Navy that



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The machine in which Miss Law made her flight. It is one of the old type, and is equipped with only 100 h.p. The gasoline capacity was fifty-three gallons, enough for only about 500 miles

made a sharp turn south, I steered due east and flew over to the Delaware River, and I followed it until I came to Port Jervis. Then I steered to the southeast, passing over Greenwood Lake. Then I went over the Ramapo Mountains, keeping close to the ground to see where I was going. Just where I hit the Hudson River I don't know; it must have been about Hastings, or possibly near Haverstraw.

I flew low down over the Hudson. I felt the cold much more than the day before on account of the dampness. It was when I was off the upper end of Manhattan that the engine began to cut out. I knew that meant the fuel had got low. The missing became worse, and I had to tip the machine suddenly, and then straighten out again to get the gasoline to flow to the carbureters. Finally, I got sight of Governors Island, and made a long sweep because I was not depending on the missing engine, but was gliding, and alighted on the Island at 9:37:35.

Help Make America First!

THE Aero Club of America, that progressive organization which has already done so much for real aerial preparedness, has started a movement to make America first in aeronautics.

Although this is the country of Langley, the Wrights, Curtiss and other pioneers, the country which gave the world the first practical aeroplane, we are about tenth in aeronautics. We are behind England, France, Germany, Austria, Russia, Italy, Turkey, and others.

Half a dozen nations have each between 2,000 and 10,000 aviators—we have only about one hundred in the Army and Navy combined. They count their dirigibles and observation balloons by the hundreds; we have none in

Omaha. England alone has over 100; Germany had about 140 before the war. Our Navy has only one aeronautic station, at Pensacola, Fla. There is not a single naval aeroplane, dirigible or observation balloon at any of the other twelve naval districts in the entire United States.

As an item of contrast, England employs 500,000 persons in the manufacture of aeroplanes, dirigibles, observation balloons and aeronautic supplies. But it should not be inferred that American aeroplanes and motors are not as good as the best European products. They are as good, and we have some good aviators, too, military and civilian.

Alan R. Hawley, the energetic president of the Aero Club of America, who, it will be remembered, began making history in aeronautics in 1906, and holds a number of records for ballooning, as well as for the number of aeroplane flights made by a non-professional, very aptly summarizes the reasons why America can be made first in aeronautics in the coming two years. He says:

"America is to be first in aeronautics because our aeroplanes and our aeronautic motors are as efficient as the best European product, our aviators are as good as any, our people and the press are thoroughly appreciative of the wonder of human flight; our need for aerial defense is as extensive as in any other country; we have more possibilities for the employment of aircraft for transportation than any other country; we have more seacoast, lakes and rivers where one can use flying boats for sport and passenger-carrying than any other single country; there has been more attention given

can be developed so fast, effectively and economically.

You will all have an opportunity of seeing the efficient aeroplanes, motors and all kinds of devices and instruments for aerial navigation next February. Between the 8th and 15th of that month, there will be held the First Pan American Aeronautic Exposition at the Grand Central Palace. I hope you will all attend and see the last word in aircraft—the things we need so badly for national defense.

To get a real idea of the defenselessness of our cities, we must fly. Edwin Clarkson Garrett, the poet, in his song of the aeroplane makes the aeroplane sing:

"I scan your mighty fortresses—
I scorn your splendid fleets—
I chart your chosen cities—
Trenches and lanes and streets.

"No secret 'neath the heavens,
No tale of land or sea,
But bares the breast at my behest
To stand revealed to me."

New York is not at all formidable from the air. It is just a pile of little toy buildings. Any enemy could fly over the city, starting from a ship 200 miles out at sea, and drop bombs and never miss hitting a vital place. A few hits would cost as much as it would cost now to build an air service substantial enough to give aerial defenses for the large cities on any one of the coasts.

Another thing that will help greatly to develop American aeronautics is the Transcontinental Aeroplane Contest to be held next summer for which a prize of \$20,000 is offered.

Winter Racing in Florida

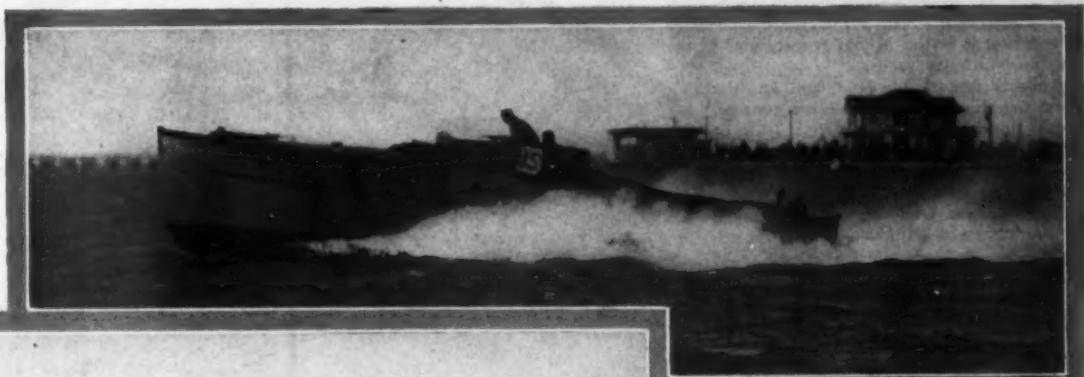
The Third Annual Regatta at Miami This Month Promises to Be the Most Pretentious Affair of the Kind Ever Held in This Country—Series of Long Distance Races Planned for Cruisers

By Rex W. Wadman

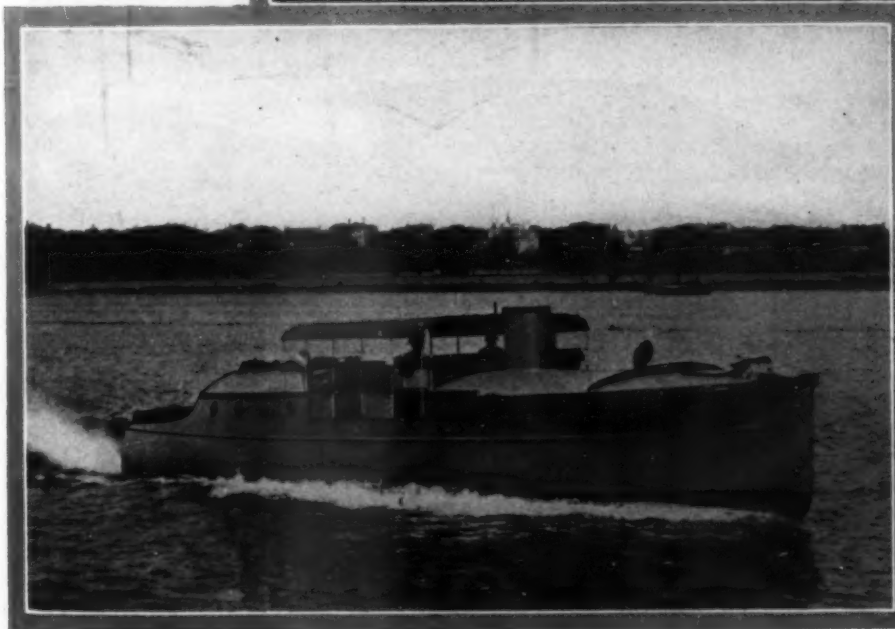
IF present indications can be taken to mean anything, half the population of the United States is planning to spend at least part of this winter under the sunny skies of Florida. The waters along the inside route were thick last fall with southward-bound motor yachts and cruisers, and old Neptune rubbed a moist hand over a fevered brow at the unprecedented size of the fleet which steamed along his ocean lanes to Florida. Elaborate plans are being made to amuse the thousands who are flocking to such important resorts as Miami, Palm Beach and St. Petersburg, and it is expected that the regatta at Miami will be the outstanding feature of the season. The com-

Starting on Thursday, January 18, the Third Annual Miami Regatta continues on Friday and Saturday afternoons. For each Saturday following, over a period of six weeks, a big long distance race is scheduled, the first being to Key West (161 miles), the second to Palm Beach (65 miles), the third from Palm Beach back to Miami, the fourth to Gun Key Light

oval, 2½ miles around, and the start and finish takes place right at the grandstand. The races start on Thursday at 2 p. m., opening with a free-for-all for open displacement boats (15 miles); the next race will be called at 2:45 p. m. and will be for express cruisers, with a qualifying speed of 20 m.p.h. (10 miles); and the third event, for aquaplanes, will be



Boomerang, the winner last year of the Miami-Key West race, will be entered in the coming regatta



H. C. Good, of Moline, Ill., has entered his Marguerite II, a Great Lakes 40-footer, for the long distance events

mittee in charge has gone at its work with a will to succeed, and the Third Annual Miami Regatta is scheduled to be the most pretentious carnival of motor boat racing that this country has yet seen.

Carl G. Fisher, of Indianapolis and Miami, to whom much of the credit for last year's successful meet is attributed, is the chairman of the committee in charge. This year he has given even more of his personal time and thought to working out the details, compiling the program and arranging the hundred and one details that go towards making up a successful race meet. Mr. Fisher's experience in automobile racing gained by his connection with the Indianapolis Speedway is standing him in good stead in working out the details of this big regatta at Miami.



Betty M established a new world's record in the express cruiser class at last year's Midwinter Regatta. Her name and ownership have been changed, and as Hazel F she is expected to defend her title

and return, out and back across the Gulf Stream (110 miles), the fifth from Key West to Miami, and the sixth from Miami to Nassau. A big entry list for each event is assured.

The first three days of the regatta will be replete with unique features. All races during these three days will be held in full view of the specially constructed grandstand, located right on the Biscayne Bay. The course is an

is not really known until the last day. The long distance races scheduled for each Saturday, commencing with January 27, will be sent away at 9:00 a. m. from the Biscayne Bay Yacht Club when scheduled from Miami; from the pier head at Palm Beach for the Palm Beach-Miami event, and from the Key West Quarantine Station for the Key West-Miami race.

called at 3:30 p. m. On the second day the open displacement boats will have to go 10 miles, and the express cruisers 15 miles, the races being called at the same times. On Saturday, the third day, the open displacement race will start at 1:30 p. m. and will be for 20 miles; the express cruiser event at 2:30 p. m. for 20 miles; and the aquaplane event will be held at 3:15 p. m.

During these three days the races will be run on the point system, each day's race acting somewhat as a heat. Each boat gets a point for finishing and a point for every boat she defeats, so the winner

Some remarkable boats will take part in these races and it is fully expected that new world's records will be established, despite the fact that two new records were hung up at Miami last year—one by Betty M and the other by Boomerang. Since that time Countess has lowered both records by winning the Block Island Race of 116 miles at an average speed of 27.69 m.p.h. and by taking the MoToR Boating trophy for the 160-mile race from New York to New Bedford at just about the same speed. Countess is a 40-foot express cruiser designed and owned by Wm. H. Hand, Jr., and powered with an eight-cylinder 6x6-inch Van Blerck. She is capable of just a little better than 30 miles an hour in a straightaway. At this writing negotiations are now practically completed whereby Countess becomes the property of a well-known Miami yachtsman who is getting the boat purely for the pleasure of entering it in the Miami regatta and in the six long distance races.

Another remarkable boat, and one that most of Miami's yachtsmen are rooting for, is Boomerang II, owned by Huston Wyeth, of St. Joseph, Mo. Boomerang II is the second boat of that name now owned by Mr. Wyeth, is 53 feet long, and has a pair of 200 h.p. eight-cylinder 6x6-inch Van Blercks. She was designed by A. Loring Swasey and is declared capable of sustaining a speed of 32 miles an hour. Both the Boomerangs will be entered in the express cruiser and the long distance races.

Mauna Loa is another spectacular boat that is expected to reach Miami in time to take part in all the races scheduled. She is owned by Mrs. A. C. James of Newport, New York and Palm Beach, and is a 56-footer, built by Lawley and powered with a pair of six-cylinder Van Blercks that drive her fast enough to make it a mighty hard proposition for any other boat of her

events across the Gulf Stream and to Key West and return. Marguerite II has the accommodations of a small house, being capable of sleeping six persons in comfort.

Commodore C. W. Kotcher, of Detroit and Miami, was the winner of the express cruiser races last year, and this year he will have a new boat, Betty M III, a 48-footer with lots of accommodations and speed. She is powered with a pair of six-cylinder Van Blercks and was designed by Carlton Wilby and built by the Church Boat Co. The first Betty M, winner of the big race at Miami last year, is also a 48-footer with the same power, by the same designer and builder. She is now owned by Walter E.

Blerck, which gives her a speed of just about 28 miles per hour.

Whippet, the spectacular 60-footer owned by Oliver Gould Jennings, of Newport, New York and Palm Beach, is after some of those prizes offered by Carl Fisher and his committee. Whippet is powered with a pair of eight-cylinder 6 x 6-inch Van Blercks that give her a speed of 27 m.p.h., and she is a duplicate of the war boats built by the Greenport Basin & Construction Co., for the Russian Government, some thirty-six such boats having already been shipped abroad. The only difference between Whippet and the war boats is that the latter have three instead of two of the eight-cylinder Van Blercks installed.

W. J. Matheson, of New York City has a beautiful home at Cocoanut Grove, Fla., close to Miami. His new boat Marpessa is 50 feet in



Mauna Loa, the spectacular cruiser owned by Mrs. A. C. James. This 56-footer, powered with two Van Blercks, is expected to make history at Miami



Boomerang II is the second boat of this name owned by Huston Wyeth. She is a Swasey boat with a speed of 32 miles

type to keep up with her, let alone beat her. H. C. Good, of Moline, Ill., has a fast one in Marguerite II, a 40-footer powered with a six-cylinder Van Blerck that he expects will be able to go through several of the long distance races to first place. The owner admits that he hasn't quite enough speed for the races on the Biscayne Bay course, but he has a boat that will prove a hard one to beat in the

Flanders, who has rechristened her Hazel F. It is fully expected that Hazel F will defend her title in January.

Rosemary, a duplicate of Countess went South early in November and will be a contestant in the various events at Miami. She is owned by Geo. D. B. Bonbright, of Rochester, N. Y., and Daytona, Fla. Rosemary is a 40-footer powered with an eight-cylinder Van

length by 10 feet beam, and is powered with a pair of six-cylinder Van Blercks that drive her quite fast enough to keep company with the speediest boats that will take part in the Miami regatta.

Carl Fisher will have at least two boats in the various races, and possibly three. Raven III is a 50-footer, powered with a pair of eight-cylinder 5¼ x 7-inch Speedways and will be an extremely fast boat. She was built at Indianapolis and was then shipped to Miami for her trials. Mr. Fisher certainly will be disappointed if he can't show his wake to the other entrants. A duplicate of Raven III will also be entered in the various events.

James Deering, of Chicago and Miami, recently wrote from Paris, entering his new speeder Psyche in all events for which she is eligible. Psyche is a 44-footer, powered with a pair of six-cylinder 5¼ x 7-inch Speedways and has a speed of 29 actual miles. She was designed and built by the Gas Engine & Power Company and Chas. L. Seabury & Co., Consolidated.

Practical Wireless for Motor Boats

How to Operate the Receiving and Transmitting Apparatus—The Fifth and Concluding Article of the Series Appearing in MoToR Boating

By Austin C. Lescarboura

IT is altogether natural that the motor boatman contemplating the installation of wireless apparatus aboard his craft, should, sooner or later, and rather sooner than later, ask: "Suppose I do install a wireless station on my boat, how can I operate it?" For in this enlightened age we are accustomed to receive full instructions and even demonstrations with a five-cent utensil or a thousand-dollar motor car; so why not with the more complex wireless equipment?

By way of answering the query, it may be said that wireless operating consists of two distinct yet inseparable phases: first, a knowledge of the apparatus—its installation, manipulation and care; and second, a knowledge of the telegraph code—the ability to transmit and receive messages in the dot-and-dash language. With the first phase mastered, it is a fact that one can hear messages passing through space and even be able to transmit unintelligible signals which are heard by others; and simple signals such as the official time from the Arlington station can be received by a person with no knowledge of the second phase of operating. But the situation in such a case still resembles closely that of a Hottentot trying to understand and be understood over a telephone line the subscribers of which are all

English-speaking people. Without the mastery of the dot-and-dash language the full value and pleasure that are derivable from a wireless equipment fail of realization.

Were wireless operating difficult to learn, there would not be tens of thousands of American boys who to-day are expert operators in every sense of the word. After all, wireless operating is largely a matter of persistent practice. The first phase—knowledge of the functioning of the apparatus—ordinarily is acquired in a few days or a week, depending upon the intricacy of the equipment. The second phase—knowledge of the code—is usually mastered in several weeks or months, depending upon the aptitude of the student and the method of instruction chosen.

With the lucid instructions that are generally furnished with wireless instruments or sets, the motor boatman should have little difficulty in mastering the manipulation of the various components of his set. The assembly of the different instruments into a complete receiver and transmitter becomes a simple matter when the manufacturer supplies the wiring diagrams and full instructions, either in the form of printed literature or in a personal letter. Obviously, in the instance of complete receiving and transmitting sets mounted on

panels or in cabinets, the work of installing is reduced to little more than the connection of the aerial and ground leads, and the power-supply wires.

One factor that should not be overlooked, although, through oversight, seldom suggested, is the wireless amateur. For, no matter where the motor boatman may be, he is almost certain to find a wireless amateur within hailing distance, which means that there is a highly trained and experienced helping-hand available at all times. It is often possible for the manufacturer of wireless apparatus to place a purchaser in touch with an amateur in his locality, whose gratuitous services may be secured in installing the wireless apparatus, in furnishing practical instructions and pointers on the manipulation of the apparatus, and in co-operating with the motor boat station while its owner is practising the code. It is indeed fortunate for the beginner that there is perhaps not another hobby whose followers are more ready to fraternize in a big, unselfish way, than amateur wireless.

Little, if any, difficulty should be experienced with the receiving set, for its successful operation, after installation, depends almost exclusively on correct wiring. Adjusting first the detector and then manipulating the various



Here is a typical Marconi wireless station on board an ocean greyhound. The operator, pencil in hand, is jotting down an incoming message on a Marconigram blank. At his right are the pneumatic conveyor tubes which permit of the rapid handling of written messages and reports between different parts of the ship

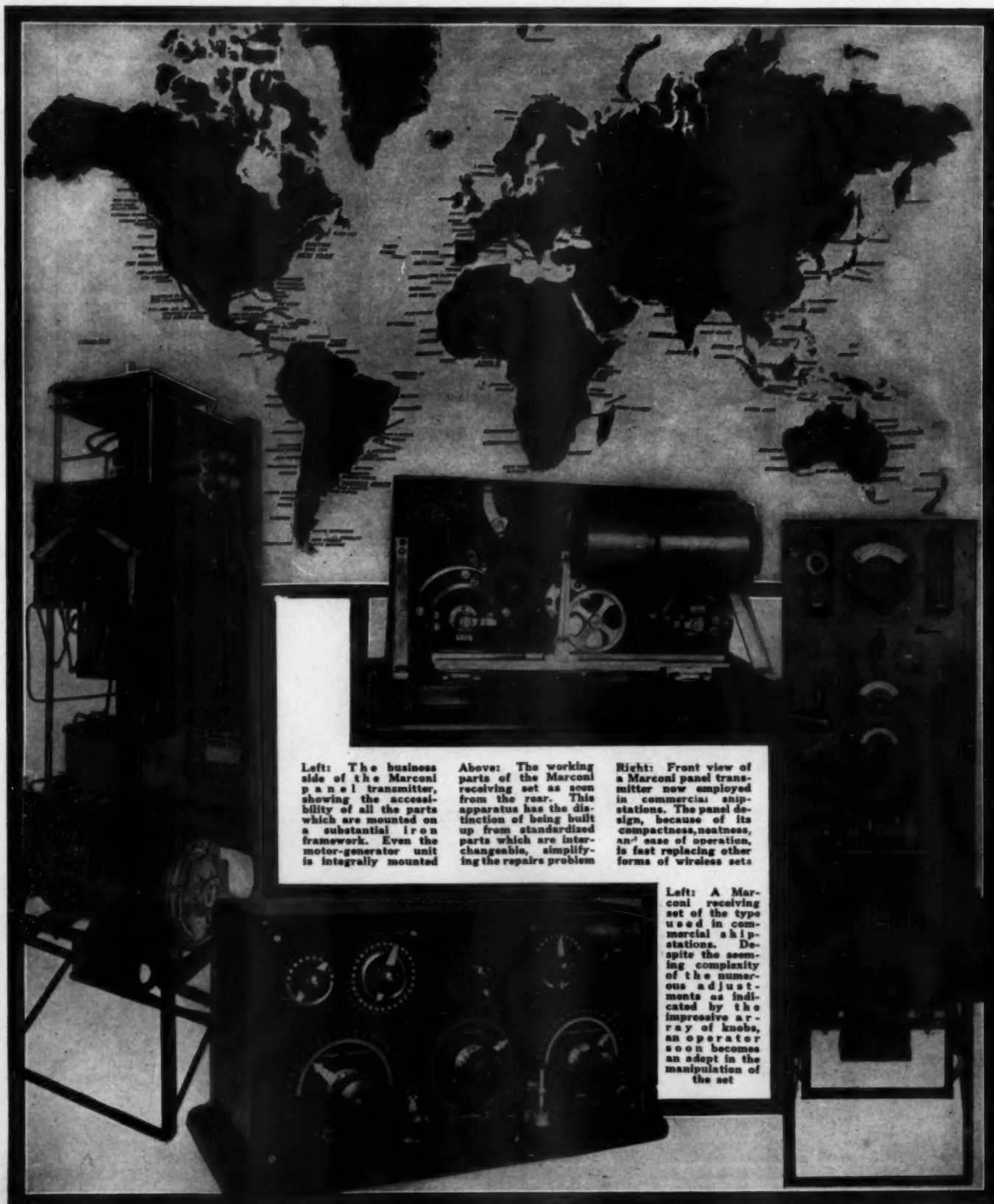
knobs and levers according to the instructions of the manufacturer, the operator, selecting the daytime or the early evening for the time of the test (since more stations are apt to be working then) should listen carefully for signals. In a short while he is rewarded by a series of musical or buzzing dots and dashes, signaling the reception of his first message. Carefully noting the position of the various knobs and switches of his apparatus—the early experience with a receiving set is largely in the nature of an exploration, so that known

adjustments must be noted as a basis for further operations—the operator proceeds to adjust his instruments in search for other signals, occasionally coming back to the initial adjustments. At first the adjusting of the different pieces of apparatus for each transmitting station heard appears confusing and, if anything, troublesome; but in time the operator becomes an adept at this manipulation, and what was at first considered troublesome now becomes perhaps the greatest source of fascination. The experienced operator prides

himself on his ability to eliminate one or more stations that are operating simultaneously, while receiving signals from the desired station.

The installation of a transmitter is more difficult than that of the receiving set, although its subsequent operation is considerably more simple for the reason that the tuning of the apparatus is fixed, and the manipulation is very little more than the working of the telegraph key. The wiring, following the diagram

(Continued on page 55)



Left: The business side of the Marconi panel transmitter, showing the accessibility of all the parts which are mounted on a substantial iron framework. Even the motor-generator unit is integrally mounted

Above: The working parts of the Marconi receiving set as seen from the rear. This apparatus has the distinction of being built up from standardized parts which are interchangeable, simplifying the repairs problem

Right: Front view of a Marconi panel transmitter now employed in commercial ship-stations. The panel design, because of its compactness, neatness, and ease of operation, is fast replacing other forms of wireless sets

Left: A Marconi receiving set of the type used in commercial ship-stations. Despite the seeming complexity of the numerous adjustments as indicated by the impressive array of knobs, an operator soon becomes an adept in the manipulation of the set

Wireless telegraphy is a world-wide means of communication. Powerful stations dot the coasts and even the hinterland of practically every civilized country of the world, insuring the intercourse of messages not only between ships at sea but also between cities, between countries, and even between continents. An amateur wireless station brings one into intimate contact with distant cities and countries

Finding the Compass Error

A Substitute for the Usual Deviation Card Which Can be Worked Out by Any Motor Boatman—
Information in Regard to One's Own Compass Which Should be Accurately Known

By A. B. Bennett

Commander Potomac River Power Squadron

ALMOST all yachtsmen understand the principles of coastwise navigation and can lay a course on the chart and allow for the errors of variation and deviation. They are in the same position as the expert rifleman who is handed a rifle and told to shoot: he has a steady hand and a good eye and will hold the rifle right on the bullseye, but if the rifle sights are all out of adjustment he has no more chance of hitting the target than will our navigator have of making a clean landfall when steering by a compass without a deviation card.

It is against the law of magnetic attraction that there should be such a thing as a compass on board a motor boat that did not have some deviation, and in all probability on some of the courses there would be considerable error. It is also agreed that it is not always practical to go to the trouble of adjusting the compass when a deviation card will answer the purpose, as the presence of an error makes no difference provided the error is known and allowed for.

Without doubt the best and quickest method is by swinging ship and taking bearings with a sighting instrument, but few of us have a sighting instrument. Yet we need to know our compass error as much as anyone does if we are to go into strange waters and navigate in all weathers. Therefore I suggest this simple method, although it does take a good deal of time and trouble to complete the card with all the errors. However, an exact knowledge of the error on every bearing is not absolutely necessary, for if the error is known on eight or more of the compass points a very fair estimate of the error on the other points can be made.

There is hardly one of us who in the course of a season's running will not have passed several lighthouses, both on water and on shore, and usually there are two or more lighthouses in sight at the same time. These lights are shown on the chart in their exact positions, so the compass direction between them can be accurately ascertained with the course protractor. If the sea is calm there should be no trouble with patience to place the boat exactly on the line between two lighthouses and note the compass reading; then about ship and place

the boat on the same line heading in the opposite direction and again note the compass reading. In this way two readings are made on each known line and the error obtained. Often there are three lighthouses forming a triangle, in which case six different bearings can be corrected within a very small space and in a short while.

With the knowledge thus obtained we shall now proceed to use the deviation card,

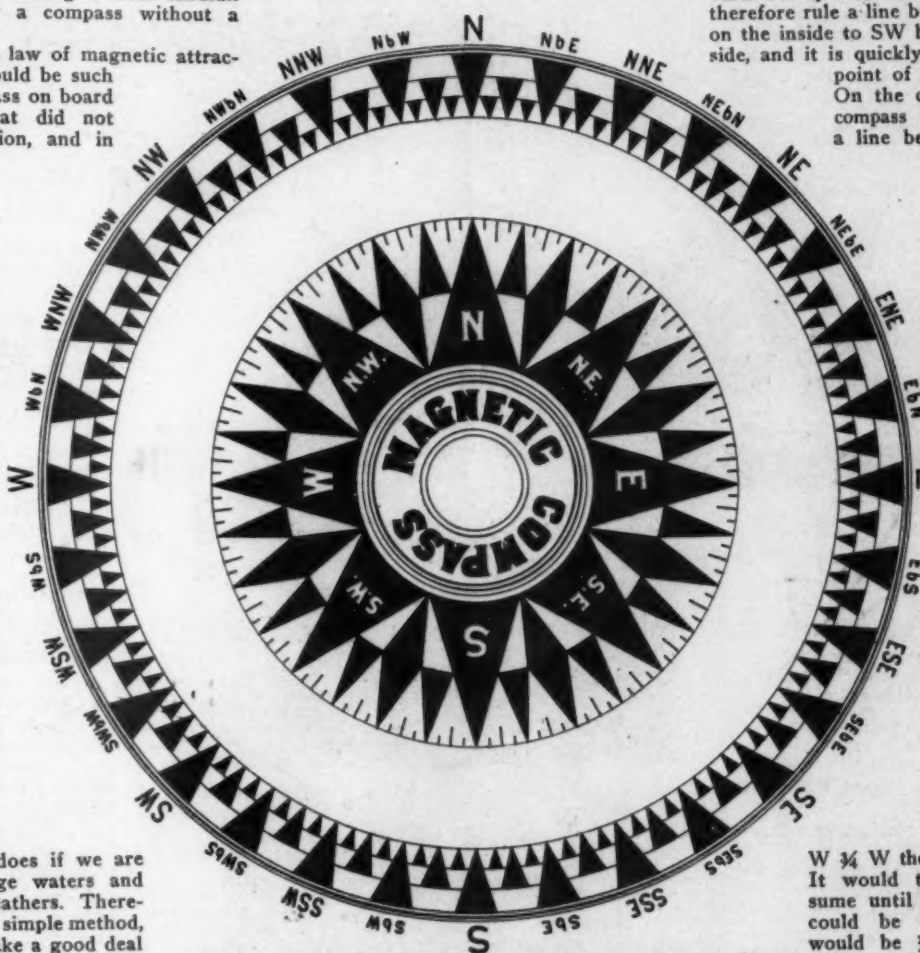
W, showing a westerly error of $\frac{3}{4}$ of a point, so we rule a straight line from S on the inside compass to S $\frac{3}{4}$ W on the outside compass. On another line between two lighthouses the magnetic course was N by E $\frac{3}{4}$ E, and on that course the compass showed no error, so rule a line between those two similar points on the inside and outside compasses. Turning around and getting on that line in the opposite direction we find that the compass reads SW by S $\frac{1}{4}$ S instead of S by W $\frac{3}{4}$ W; therefore rule a line between S by W $\frac{3}{4}$ W on the inside to SW by S $\frac{1}{4}$ S on the outside, and it is quickly seen that there is a point of error on that course. On the course SW by S the compass was at SW, so place a line between SW by S on the inside and SW on the outside compass.

Then on the course SW by W $\frac{1}{4}$ W the compass was W by S $\frac{1}{4}$ S, so draw a line between these two points. It will be seen that the error is the same on the last three observations, and if it were not possible to get any bearing on the points between these points it would be safe to assume that the error would be the same, or one point of westerly error. On the course NW by W $\frac{1}{4}$ W the compass reads NW by W $\frac{1}{4}$ W (a half point of westerly error), and on the course N by

W $\frac{3}{4}$ W the compass was correct. It would then be safe to assume until the exact knowledge could be obtained that there would be $\frac{3}{4}$ point of westerly error at NW, which is about midway. As we found the compass correct on the courses N by W $\frac{3}{4}$ W, N, and NE by N $\frac{1}{4}$ N, it would be safe to assume that the compass was correct on all the courses between those points.

It is not necessary to go all around the compass card in this article, as what I have given will make clear how easy and simple

it is gradually to develop a deviation card which would prove of great value many times in the course of a summer's cruise. The example I have given is a concrete case, and illustrates very well that a compass may be correct across quite a fair-sized arc and have a very decided error in another arc, so it is wrong to assume that because you have found your compass correct on several courses that it is correct all around the card.



A deviation card which can be cut out and used on your boat. The inner compass is magnetic, and the outer one represents the compass on your craft. Put your boat over a number of courses whose magnetic direction can be determined from the chart, and note the headings as indicated by your compass. Draw a line in each case on the above card from the point on the inner (magnetic) compass, representing the chart course, to the outer point which is indicated by your compass. Going over eight courses and the reverse of them will give you the deviation of your compass on sixteen different headings. You will then have a deviation card which will show the compass course which should be steered for any magnetic course

illustrated with this article. For the sake of a clear understanding I shall ask my reader to draw upon the card the lines as we take them up. On running north upon a magnetic north-and-south line, the compass reading was north, showing that on that course there was no error, so we shall rule a straight line between the north point of the inside compass and the north point of the outside compass. On going south on that same line the compass reading was S $\frac{3}{4}$

Motor Boating In the Jungle

The Fascinating Labyrinth of Waterways in British Guiana, Where the Sound of the Exhaust Competes With the Raucous Cries of Tropical Birds and Beasts—A Fairyland for the Boatman

By A. Hyatt Verrill

IT is difficult to imagine a spot which is naturally better adapted to motor boating than British Guiana.

It is a land of woods and water, a country of enormous area covered with a vast network of great rivers, winding creeks and innumerable streams, and withal a scenic wonderland to northern eyes. Although intensely tropical and less than five hundred miles from the equator, British Guiana's climate is not oppressively hot, and is far from unhealthy. Indeed, the motor boatman, cruising on the great rivers or the interior creeks, will find good heavy blankets a necessity at night, and even at midday it is seldom as warm as on a summer's day at home, unless one is exposed to the full glare of the sun where there is no wind.

Moreover, it is a land easy of access, reached by several lines of excellent steamers from New York, and as it is a British colony, language, laws and customs do not trouble the visitor from the United States. In



The motor boat has not yet taken British Guiana by storm, and as a result native navigation is slow and tedious



One sees clumsy lighters propelled by rude sails and immense sweeps, but depending mainly upon the tide for progress

addition, Georgetown, the capital, is a great, busy up-to-date town with well stocked stores, excellent hotels, well equipped machine shops and boat yards and with every necessity required by the tourist, resident or motor boat enthusiast from the north.

Although practically all travel in British Guiana is by boat, the inhabitants are very backward in the use of power-equipped craft, and motor boats for pleasure purposes are scarcely known. Fairly large steamboats ply up and down the larger rivers; passenger boats are operated in a few places to reach outlying towns where the larger steamers cannot go, and a few smaller motor craft and one or two semi-speed boats are used by the people of Georgetown and the neighboring plantations.

As yet the well-to-do natives have not awakened to the pleasures and advantages of reliable motor boats, but they are enthusiastic users of automobiles and motor cycles, and internal combustion motors are used far more extensively for industrial purposes than in our own towns. Sawmills, rice mills, machine shops and other factories use gasoline power, the fire department boasts excellent gasoline-driven apparatus and even the road rollers are power-driven, so that when good, reliable motor boats are once introduced and the inhabitants discover that a motor boat is no longer a vexatious, obstinate nuisance, the rivers of the colony will swarm with the handy



The civilized Indians wear store clothes and so divest themselves of their natural heritage of the picturesque

little craft, and rowing days will be past.

We are accustomed to think of equatorial countries as unhealthy, swarming with pestilential insects and venomous snakes; hotbeds of fever and disease and teeming with dangerous beasts. Yet in reality nothing could be further from the truth—in British Guiana, at any rate. The climate, as already stated, is excellent, albeit a trifle rainy at times; but the death rate among Europeans is lower than in New York. Snakes—even the non-poisonous kinds—are extremely scarce; yellow fever is unknown, malignant malaria is not prevalent, and typhoid and other dangerous maladies only occur as isolated cases and usually are confined to the poor working classes of blacks and East Indians. Dangerous beasts are conspicuous by their absence, and even the jaguar, which is never dangerous unless wounded, is so shy and rare that it is next to impossible to find one even when hunting with skilled Indian hunters.

But while all these adjuncts to the conventional tropic land are lacking in British Guiana, there is plenty of intense interest and wonder to be seen, and the country stands alone and unique as a land where the visitor may step into his motor boat at the docks of a modern busy city and in the space of an hour find himself deep in the heart of the jungle. Here one may travel the length and breadth of the land by motor boat and here see all the wonders of the tropical forest, the life of the wilderness, the aboriginal Indians in their own homes, the roaring cataracts and stupendous falls, the great greenheart grants, the gold diggings and diamond fields—in short, may penetrate to the very heart of South America without the least discomfort or hardship.

There is an endless variety of trips one may take by motor boat on the Guiana rivers, for there is scarcely a stream that flows into the sea which is not navigable for many miles, while many of them are so deep that ocean-going vessels steam for over sixty miles inland. This is the case with the Deme-

rara River, which empties into the sea at Georgetown and forms one of the principal arteries of travel to the interior. The Demerara is very crooked and winds back and forth in a most uncertain manner, and while not so broad as the Essequibo it is even more scenically attractive. For a number of miles after leaving Georgetown the shores of the river are bordered by mangroves, broken by open spaces, and with great sugar estates stretching

anchor near shore to wait patiently until the current again flows in the desired direction. Slow as this method of transportation is, it takes four tides at least to travel from Georgetown to Wismar or vice versa—nearly all the freight to and from the interior is transported on these lighters, and the owners make a good livelihood.

Above the islands the clearings and houses become fewer, and soon the traveler is upon

a stream bordered only by the endless "bush" or jungle. Mile after mile it extends—green, luxuriant and dense, but not uninhabited as the occasional Indian huts and canoes testify. By skirting close to shore one may catch glimpses of many strange tropical birds

heart lumber camps and is also the terminus of Sproston's steamboat line and the railway to Rockstone on the Essequibo River, twenty miles to the west. Oftentimes, in fact usually, there are huge three-masted schooners, stately barks and even ocean steamships lying before Wismar loading lumber. It is a strange sensation to come around a bend of this jungle-bordered river and see great ocean-going ships lying here far in the interior of the land.

Above Wismar the river passes through the interminable forest and one may travel onwards by motor boat for nearly fifty miles, or until barred by the rapids which break the tranquil surface of the stream by jutting rocks and swirling foam. These rapids are on practically every river at a distance of from sixty to one hundred miles from the sea, and while small boats in the hands of the skilled river men may travel up or down many of them, they mark the inland limits of motor boat travel. But one need not regret this, for there are thousands of miles which may be traveled and plenty to be seen between the rapids and the coast.

The Essequibo, which flows into the sea just beyond the Demerara and some twenty miles from Georgetown, is an immense stream, being five to ten miles wide at its mouth and nearly



The Indian is a natural marksman, and with his arrow he can catch fish which spurn the enticing hook and line

inland. Here and there are little canals or creeks, their outlets closed by huge lock-like gates, for the canals are for drainage purposes and the sluice gates are opened or closed according as the tide is high or low. Beyond the sugar district palms, bush and trees clothe the banks, little thatched and wattled huts peep from the foliage, and strange giant lilies or "mucka-mucka" grow thickly in the shallows.

Moored before the houses, or tied in shady creeks, are dugout canoes or "coorials,"

great spoon-bottomed river boats and occasionally a tiny "wood-skin"—a strange, frail craft built of a single strip of bark and much favored by the Indians and colored people of the rivers. At intervals of a few miles are rude wooden docks or "stellings" with tiny villages or clusters of houses at their landward ends. These are usually the "ports" of the nearby estates or small country towns and form regular points of call for the river boats. Some fifteen miles from the capital the first great

wooded island is passed—several miles in length and seemingly barring the river—but there are wide channels on either side and several more islands are just beyond.

Floating slowly with the tide one sees immense river lighters on their way up or down the river—clumsy craft propelled by rude sails and immense sweeps, but which depend mainly upon the tide for progress. Upon them the negro or Indian owners live in thatched, hut-like shelters, and when the tide turns they



The rapids which are in nearly every river at a distance of sixty to one hundred miles from the coast bar further progress inland

two miles in width at Bartica, sixty-five miles inland. Unlike the Demerara River, the Essequibo is fairly straight, and from its mouth to the rapids its surface is dotted with hundreds of wooded islands, varying from mere dots of green to great cultivated islands a score of miles in length.

One of the first of these—known as Dauntless Island—is notable as it owes its origin to the wreck of the sloop Dauntless which grounded on a sandbar in the river some forty years ago. Any obstruction in the stream causes the silt and sand to pile around it, and soon an islet commenced to grow above the stranded vessel. Presently mangrove seeds found lodgment, trees sprung up, the mucka-mucka filled

the shallows, more sand and mud accumulated and to-day a large heavily-wooded island marks the grave of the long-forgotten Dauntless.

If you wish to glimpse the wonders of the tropical wilderness and view the aborigines in their homes, leave the main river behind, and enter one of the half-hidden creeks that wind in and out of the bush in every direction. There are many such near Bartica, as in fact

(Continued on page 56)



It is all right for the man in the stern, but what wouldn't the five dusky oarsmen give for a little single-kicker?

and perchance a few animals, or even great anacondas coiled among the bush that borders the river. But snakes are rare, even in the more unfrequented districts, and as a rule white and blue herons, parrots, bright-hued tanagers and mannikins and the omnipresent yellow-breasted tyrant birds or kiskadees are the only forms of life seen until one passes above Wismar, sixty miles from Georgetown.

Wismar is a small town, but an important one, for it is the main outlet for the green-

Lubrication in Its

Part II—Refining

The Preparation of Lubricants for Internal Combustion Motor Use Engine Industry—Tests Which Are Made to Deter-



Above: Testing for the fire point or temperature at which the oil ignites from vapors. Right: Comparing the color of an oil with the color of standard chemical solutions

ONE of the most important features of marine engine design is the proper lubrication of the bearing surfaces, but no less vital to the success of any motor is the quality of the lubricant used. Had the refinement of lubricating oils not kept pace with the industry—that is, had not the refiners evolved a quality of oil which was superior for the purpose to the grades used for machinery and steam engine lubrication, it is hardly likely that the internal combustion engine would be in the commanding position it occupies to-day.

For this reason more than usual interest attaches to the refinement of lubricating oils and to the tests to which they are subjected for determining their fitness. Lubricants, like gasoline, are a product of petroleum, and up to a certain point their refinement is identical with that of the motor fuel. That is to say, the crude is refined in a still from which first arise the vapors which are subsequently condensed into gasoline, and the process is continued until the lighting oils and the lubricants are given off in vapor form. The subsequent processes differ, however, the refinement of cylinder oils being more complex than that of gasoline.

There are three processes of distilling petroleum in use, and of these steam and vacuum distillation are employed for the production of lubricants. The third process—destructive distillation, or cracking—has been devised for quantity production of gasoline, benzo-toluene and other hydro-carbons lighter than lubricating oils. In steam refining, steam is admitted to the still in order to reduce the pressure and minimize the cracking effect; and in vacuum distillation suction blowers are employed for the same purpose—that of increas-

ing the yield of lubricating oil from a given quantity of crude.

Whatever the process used, a secondary distillation is necessary in order to eliminate from each "cut" certain compounds whose presence is not desirable in the finished product. When this has been effected the next requisite consists in removing paraffin, wax, free carbon and other impurities, and their elimination constitutes the refinement, proper, of the oils. Two general processes are in use for this and they are known as the sulphuric acid treatment and filtration. With both processes the aim is to get rid of impurities and compounds of high molecular weight whose presence in the refined oil would impair its usefulness for the exacting service of internal combustion engines, and also to brighten the color to bring it up to market standards.

The acid process consists of treating the lubricating oil fractions of distillation with concentrated sulphuric acid in order to polymerize the unstable compounds and precipitate them. After this is done the oil is carefully washed with water and then treated with an alkaline solution for the purpose of neutralizing the acid. It is then washed again to remove the free alkali, and is finally blown with air to eradicate such traces of water as

in the oil. The introduction of alkali in the treatment converts this acid into sulphonic salts, and these on coming in contact with the superheated cylinder walls of a motor undergo a further change and are converted into sulphuric salts with the liberation of free sulphuric acid. This acid loses no time in attacking the good oil and in precipitating a black sludge or sediment. The catalytic action of sulpho compounds in heated lubricating oils causes polymerization and oxidation and eventually leads to complete destruction of the oil contaminated by these compounds. Thus, although oils treated with acid are good in color and appear to be satisfactorily stable, they fall short of the ideal in actual service.

On the other hand, oils which are refined by the filtration process possess none of the inherent disabilities mentioned above, as no acid is introduced into their refinement.

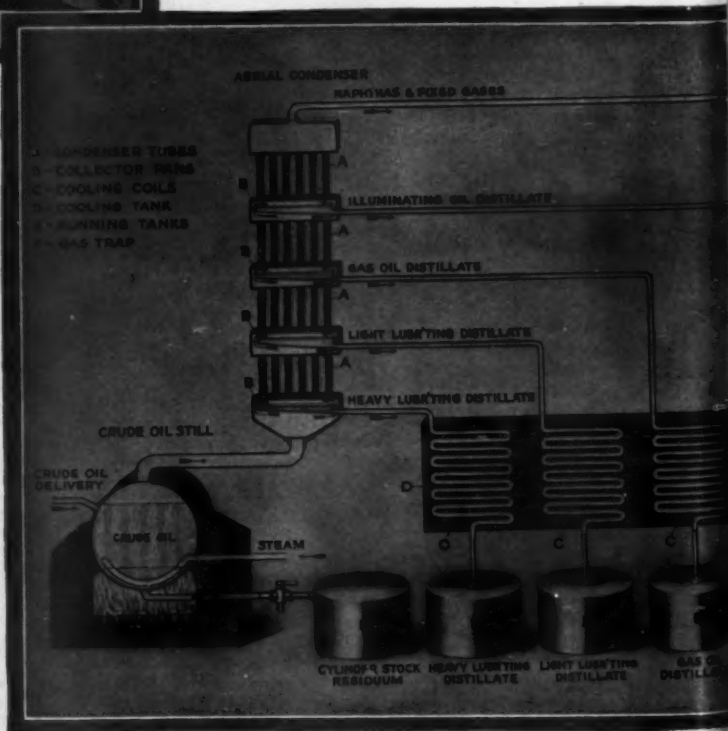
This method is simple in the telling, at least, for it consists principally of filtering the various motor oils, after they have had their secondary distillation, through fullers' earth. Just what the chemical reactions between fullers' earth and the oil are is not definitely known, but they result in removing color-bearing constituents and other compounds of high molecular weight, such as pitches and resins. Free carbon is also removed, and the completed product of this filtration is practically unmarred by unstable compounds.

As the chemical analysis of lubricating oils would be both exhaustive and costly if undertaken on a commercial scale, most refiners content themselves with making certain physical tests from which, by experience and intelligence, they are enabled to determine the good qualities of their products. Two of these tests, as stated in the December issue of MoToR Boating, are for the purpose of finding the flash and fire points of the oils, or their volatility and inflammability. The others include examining the oils for their gravity, viscosity, odor, color and congealing temperature. All of them are of an extremely practical nature and are nearly duplicated in actual service.



may be present and would, if not eliminated, cause cloudiness in the completed product. In a modification of this process the oils are subjected to only a light treatment with sulphuric acid in order to give them a color which will be light enough to render them salable, and the refinement is then completed by filtration. Such oils may be called filtered oils in the trade, but they retain the chemical characteristics of acid-treated oils, and do not correspond to oils which have received the full filtration treatment.

The objection to acid-treated oils is that the sulphuric acid causes chemical reactions which prove deleterious to the oil when subjected to high temperatures. For instance, sulphonic acid is produced and this, in spite of the subsequent washings, remains dissolved



Various Phases

and Testing Oils

an Exact Science Which Has Been Developed Abreast with the mine Viscosity, Flash, Fire and Congealing Points, Etc.

The viscosity or body of an oil is ascertained by allowing a certain quantity of the liquid to flow at a standard temperature (60 degrees F) and at a given starting head through a capillary or efflux tube. A record is kept of the number of seconds' time taken for this flow, and the oil is rated according to an arbitrary standard. Good body is required of an oil so that it will provide a frictionless layer between bearings and form a seal between the cylinder and the piston to conserve compression and prevent the exploding gases from blowing themselves into the base of a motor. Oils of sufficient body are also needed to counteract the tendency of the moving piston to force the lubricant into the combustion chamber.

The flash point of an oil is determined by heating the fluid over a slowly rising temperature and periodically passing a test flame over it. The lowest temperature at which the vapors arising from it ignite without setting fire to the oil itself is the flash point. This temperature having been determined, the oil is further heated until the point is reached at which it will burn when the flame is passed over it and quickly withdrawn.

The practicability of these tests is almost self-evident. If one were to use oil of such low flash point that that part of it which clung to the walls on the down-stroke of the piston were ignited by the flame of combustion, he would find himself burning oil almost as rapidly as fuel, while that which remained unconsumed would be of doubtful value as a lubricant.

The specific gravity of an oil is interesting chiefly from the refiner's standpoint, as from it he can largely ascertain the kind of crude from which it was refined. Liquids lighter in gravity than water are read in this country from the Baumé hydrometer which is allowed

to float in the oil or other liquid under test.

Color is another attribute which more closely concerns the producer than the consumer, and even he cannot be entirely guided by its correctness in this particular. An oil's quality and its durability and suitability for a given purpose may be partially judged by the color test, but not conclusively. The test is made with a Lovibond calorimeter by which the expert is enabled to compare the oils, by transmitted light, with the colors of standardized chromate solutions, or with glass slides which have been colored to correspond with these solutions.

The congealing point is of importance to the user, because if it should be as high as the temperature of the surrounding atmosphere when the motor is started, the oil would be too stiff to be freely circulated through the engine, with the result that bearings would be starved or the pump broken. Every automobilist who has driven his car in severely cold weather will recall the difficulty he has had in shifting gears. While in marine use there are no gears to be thrown in and out of mesh, the principle is the same,



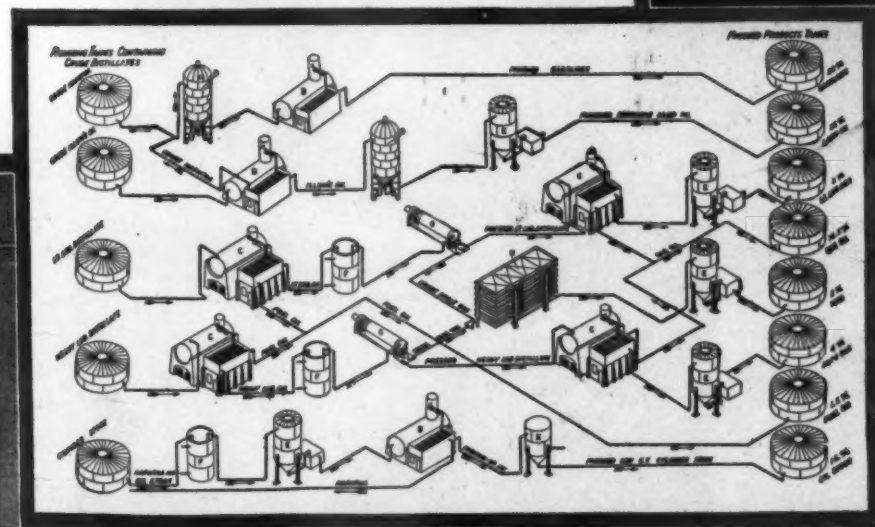
Above: Flash test for determining the lowest temperature at which the vapors given off from heated oil ignite without causing the oil itself to burn. Left: The cold test for determining the lowest temperature at which oil can be poured

contains carbon, but carbonization in actual service is governed somewhat by the viscosity and flash and by the mechanical imperfections of a motor.

A test which can be made by the boatman for determining whether his oil contains acids, animal or vegetable oils or hydrocarbon oxidation products is the simple emulsion test. From the emulsifying properties of oils with water may be estimated with a fair degree of accuracy their general excellence, and if, after a period of twenty-four hours an emulsion which has been made of oil and water in equal parts has entirely separated, a freedom from the above impurities is indicated. If, however, the emulsion has not become thoroughly separated, it is an indication that the oil is contaminated by some of these impurities.

Owing, however, to the fact that hydrocarbon oils possess a great affinity for oxygen when exposed to the direct rays of the sun, this test should be made only with samples which have not been so exposed, as otherwise the results obtained from them would not accurately indicate the quality of the oils.

Although it has been discovered in experiments that there is no exact relationship between the flash and evaporation points of an oil, it is true that oils of low flash point evaporate with greater rapidity than those of high flash. The rate of evaporation depends, however, chiefly on the boiling points of an oil's constituents. So although the custom sometimes obtains in the trade of mixing with extra heavy grades oils which are too light to be used alone, and thus securing a lubricant of correct viscosity, a combination is formed which will evaporate quickly. The use of such oils will, of course, prove costly to the engine owner. Tests of various oils for the determination of their comparative rate of evaporation may be easily made by the amateur experimenter.



Left: Diagrammatic illustration showing the separation of crude petroleum into groups by distillation. Vapors from the still are sent to the lower part of the tower, then upward through condensing tubes, liquids of different gravity being passed out at the proper point. Above: Separating and finishing first-group products. B and C are stills; D an agitator, E, fullers' earth filter; F, chilling tank; G, wax filter press; H, wax sweater, and K, air drying tank

and a stiff, heavy oil in motor or reverse gear spells sluggishness and loss of power.

Another interesting test is that for determining the carbon residue of an oil. This test, which is made by distilling a small quantity of oil to the end and measuring the amount of carbon left in the flask, although interesting to the expert, it is not accurately indicative of the amount of carbonization in the combustion chamber of a motor. Every oil



She is 37 feet in length and has a speed of about 20 miles per hour

Martha II

A Philadelphia Boat Which Was Built for Comfort But Which Has Plenty of That Commodity Termed Speed

MARTHA II is one of those comfortable boats that go far to make the sport of motor boating popular, and to awaken in the hearts of those who observe not so much envy as a firm resolve to have one something like her. She is 37 feet in length by a beam of 7 feet, and she is powered with a six-cylinder Van Blerck with self-starter is installed.

Photographs by Pearce



Roominess characterizes Martha II's cockpit

ered with a 5½ x 6-inch six-cylinder Van Blerck, which gives her an average speed of 20 m.p.h. She was designed and built by H. C. Ford, of Bordentown, N. J., and is owned by Mitchell Stead, of Philadelphia, Pa.

Martha II was built first of all for comfort, as her roomy cockpit and below-deck quarters will attest, but enough speed was incorporated in her make-up to permit her to get to places without allowing all the other craft in the river to take her measure.

It is declared that Martha II was a very economical boat to build, and that once in the water she proved the economy inherent in her by drinking sparingly of gasoline and oil. Her owner had splendid satisfaction with her during the past summer.



A six-cylinder Van Blerck with self-starter is installed



The owner, Mitchell Stead, of Philadelphia, has used his craft extensively, and has found her to give satisfaction in every way

A New Squadron

Amalia III, a Recent 60-Foot Addition to the—Staunchly Built Craft With Comfortable

ONE of the finest motor yachts of this season's production is Amalia III, which was designed and built by the New York Yacht, Launch & Engine Co., of Morris Heights, New York, and delivered in midsummer to Carl Reinschild, of New York, a member of the Colonial Yacht Club. Commodore Reinschild used his craft on Long Island Sound during the summer months, and found her to be a very substantial and seaworthy vessel. Being a member of the United States Power Squadrons, he also entered her in the recent squadron maneuvers.

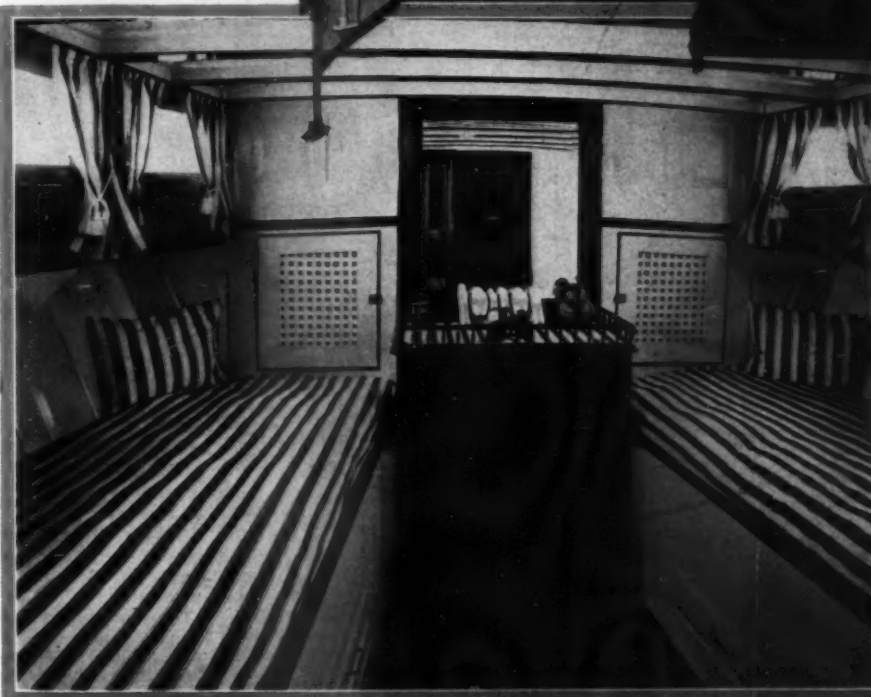
Amalia III is 60 feet over all with a waterline length of 55 feet, a beam of 13 feet 6 inches, and 3-foot, 6-inch draft. She is equipped with

Cruiser

Fleet of the H. R. P. S. Accommodations



Bridge of Amalia III, with Commodore Reinschild at the wheel



The after stateroom. Note the gratings opening into the storage space under the stern deck

a four-cylinder $6\frac{1}{2} \times 8\frac{1}{2}$ -inch 40-50 Twentieth Century motor. The hull is of heavy construction with oak keel, stem, stern and frame, and the planking is of heavy pine, entirely fastened with copper, and riveted over burrs. The keelson, stringers, clamps and hogging clamps are of yellow pine and everything is put together with an idea of staunchness.

The general layout of the boat's interior is as follows: Aft of the forepeak is the crew's toilet, followed by the engine-room, wherein the quarters for the crew are also provided. Next aft comes the galley, extending the full width of the boat between the engine-room and the saloon. The latter compart-

ment occupies the amidships section of the boat and is immediately followed by the owner's stateroom. Aft of this stateroom is a short section occupied by the owner's toilet and a passageway to the deck, while

Amalia III

Length.....	60 feet
Beam.....	13½ feet
Draft.....	3½ feet
Motor.....	Twentieth Century
Capacity.....	40-50 H.P.
Builder.....	N. Y. Y. L. & E. Co.
Owner.....	Carl Reinschild

another stateroom completes the arrangement plan.

The engine-room is 11 feet in length and is an unusual combination of compactness and roominess, for although in addition to



View of the dining saloon looking aft into the owner's staterooms. As completed, the arrangement of the saloon differs a little from the plan layout shown on the next page

the main power plant it contains sleeping accommodations for two men, work bench and an independent lighting plant, there is plenty of free floor space for getting at the various parts of the mechanical equipment. At the after end of the engine compartment on the starboard side and next to the door leading

into the galley is a large locker and on the bulkhead to port is the electric switchboard. The galley is 4 feet

aft, and the desk in the other side of the leading into the stateroom.

stalled just doorway owner's The saloon is finished in

beam has not yet been diminished by the run to the stern. It is, therefore, wide enough to contain two full width double beds in addition to a bureau and two lockers. The owner's toilet, in addition to the usual equipment, is fitted with a square tub. All of the plumbing is of the J. H. Curtiss type.



deep and as before mentioned extends the full width of the boat. The sink is placed in the center of the compartment, the ice-box on the starboard side and a three-hole stove to port. The ice-box fills from a hatch in the deck, and, with other trouble-eliminating features and its extreme roominess, the galley is one in which it is a pleasure for a cook to work.

The saloon is 10 feet in length and is fitted with two extension sofas, one of which extends in an L around the forward bulkhead on the starboard side, giving comfortable seating space at two sides of the dining table. The further arrangement of this compartment is a little different in the actuality from the plan shown at the bottom of this page, the buffet instead of the writing desk being placed on the starboard side



In addition to the 40-50 h.p. Twentieth Century motor, the engine-room contains an independent lighting plant and two berths for the crew

beveled paneled mahogany.

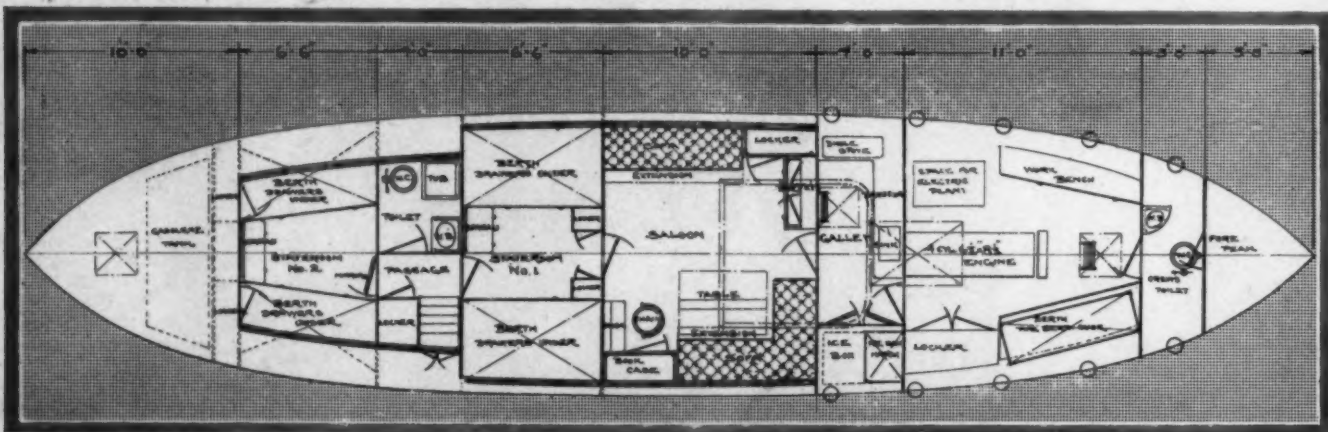
The owner's forward stateroom extends the full width of the boat at a point where the

stands over the entire deck and there is lots of room for chairs and couches. The arrangement plan is shown below.

Amalia III is a new 60-footer which is big in outboard appearance and roomy in interior arrangement

Stateroom No. 2 is also fitted with two wide berths with a bureau between. The finish of these two staterooms is in paneled white enamel with mahogany trim.

The accommodations of this boat work out in a very practical way, the owner's two staterooms being accessible from the starboard deck and the saloon getatable from the main deck by means of a companionway. The locker room and storage space in the boat are exceptionally large. The outside of the cabin is finished in mahogany with the after deck bright and the main deck canvas-covered. An awning



Plan view of Amalia III. The accommodations of this boat work out in a very practical way both for the owners and the crew

One of New York's "Defenders"

Sunbeam II, the 43-Footer Owned by R. B. Roosevelt, Which Was Flagship of Group I, New York Division, in Last September's Mimic War Maneuvers—Substantial High-Speed Cruiser



Sunbeam II is one of the Speedway scout cruisers. She is powered with a six-cylinder 80 h.p. motor and is capable of a speed of 17 m.p.h.

ONE of the most successful of the motor craft which gathered together in September to defend New York Harbor from attack by an imaginary enemy, was Sunbeam II, and one of the most active of the civilian cohorts was Robert B. Roosevelt, of Washington, her owner. Sunbeam was flagship of Group I and was on the job for the duration of the training period.

She is a 43-footer, designed, built and powered by the Gas Engine & Power Co. and Chas. L. Seabury & Co., Cons., of Morris Heights, N. Y., her motor being a six-cylinder 6 x 6-inch 80 h.p. Speedway with aluminum base and frame. Her speed is 17 real miles an hour, her beam 9 feet and her draft 3 feet 1 inch.

The boat is strongly and substantially built throughout, having white oak keel, stem and frames, cedar planking and hardwood trim. The chain locker is arranged under the forward deck, followed by a toilet room. Next aft is a state-room with a bed on the port side and upholstered seat opposite. Aft this is the engine-room, under the steering deck. Two 56-gallon fuel tanks constructed of copper are arranged under this deck, on either side of the motor, and two upholstered seats are fitted on the after part of the deck.

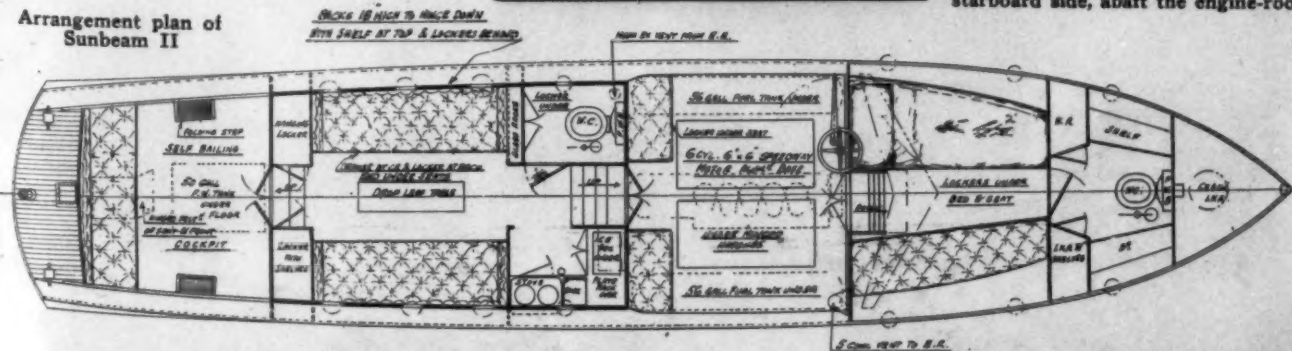
Following the engine-room is a toilet on the port side and a galley opposite, and the main cabin comes next. A self-bailing cockpit completes the arrangement of the boat.

Photographs by Rosenfeld



The galley, equipped with a Speedway alcohol stove, is arranged on the starboard side, abaft the engine-room

Arrangement plan of Sunbeam II

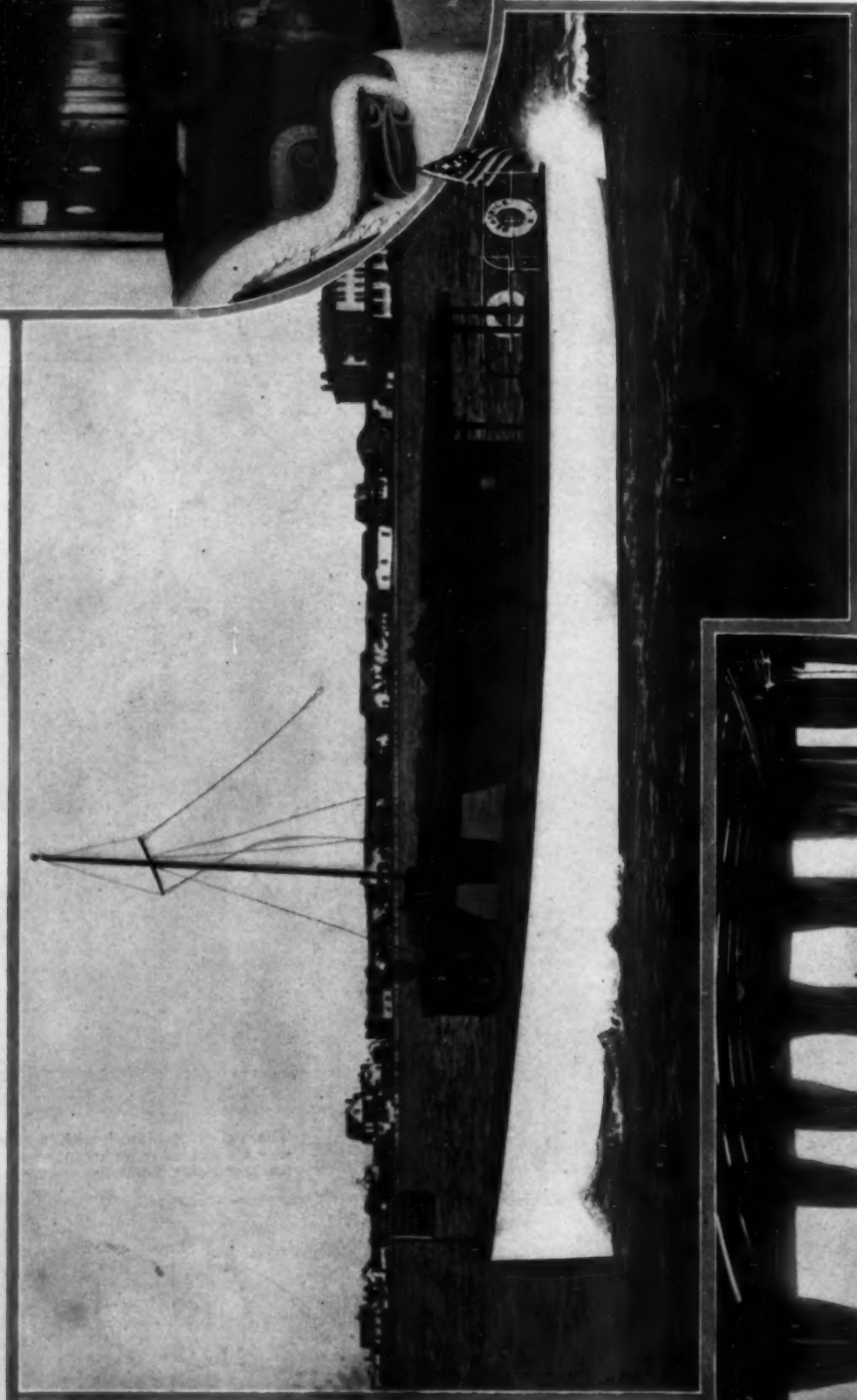


A South Shore Fishing Cruiser

Photograph by Rosenfeld



The four-cylinder Van Blerck, installed in the after cabin, is controlled from the wheel



Beatrice, owned by Edwin C. vom Hofe, of Amityville, L. I., is used for cruising, fishing and hunting

A CABIN cruiser which is a familiar figure to the amateur fishing contingent of Great South Bay is Beatrice, owned by Edwin C. vom Hofe, of Amityville, L. I. She was designed and built by A. S. Smith of that town, and has been in satisfactory service for two seasons. With her present power plant, a four-cylinder 30 h.p.

The forward cabin



for the storage of dunnage, and accessible from the forward cabin. This cabin is fitted with a folding table and two Pullman berths, which, during the day time, serve as transoms. Under each of these drawers which will take care of all the wearing apparel of the party on a cruise and eliminate the necessity of carrying suit-cases and bags. The toilet room, fitted with toilet and wash basin with running water, gravity fed, is entered from the main cabin. Also located in the cabin are a large commodious ice chest, dish closets, linen locker, glass racks, two closets for boots and oilers, and a closet for all electrical apparatus.

Between the forward and after cabins is a bulkhead upon which are built two closets. One of these provides for the guns and fishing tackle and the other is arranged for hanging clothing. The after cabin contains the Van Blerck engine, and near it is the galley which is equipped with porcelain sink, three-burner Jewel stove and running water. In the after cabin, also, are three pipe berths.

Beatrice's forward deck is divided into two compartments—the first for the cables, and reached by a hatch in the deck, and the second

Van Blerck, she attains a speed of 10½ miles an hour, but it is expected that 14 miles will be reached when a new 6x6-inch four-cylinder Van Blerck is installed in the spring.

The Fuel Problem Solved

A Remarkable Oil Engine Which Will Run on Kerosene, Crude Oil, Road Oil, Cod Liver Oil, Lard, Butter or Cream—One Which May Be Started Cold and Has Neither Bulb nor Electrical Ignition

By E. B. Blakely

Mechanical Engineer, Sears, Roebuck & Co.

HOW would you like to have a motor in your boat which had no carbureter, batteries, magneto, wires or spark plugs, and which would start and run on any fuel that flows freely and contains either animal or mineral fats or oils? "Ain't no sich animal," say you. Well, in these days it is not safe to say a thing can't be done, for you are usually interrupted by someone's doing it and there are right now seven or eight companies building such engines for both land and marine service.

Five years ago R. M. Hvid, a naturalized Danish engineer, built and patented his first engine—a machine that would do all the things mentioned above. Quite naturally, he first went to some of the biggest manufacturers of engines and offered to grant them a license to manufacture his new type of engine, but they turned him down because he would not grant them the exclusive rights and also, perhaps, because his scheme sounded like a pipe dream. The writer himself heard of and saw the first engine some four years ago, and is frank to say that he was extremely skeptical, and at first even thought it might be another Keely motor. However, after keeping in touch with developments concerning this Hvid motor and having done some very exhaustive experimenting and testing, the writer now says that he considers this system of Hvid's the most important invention in internal combustion motors that has been made in the last fifteen years.

The writer himself has actually run a Hvid type motor on the following fuels: kerosene, crude oil, fuel oil, road oil (35 per cent. asphaltum), cod liver oil, castor oil, lard oil, cylinder oil, melted butter and thick cream. Of course, most of these would be entirely impractical as fuels, both because of their cost and their low heat value; but the fact that the engine will run on them at all speaks volumes for the principles involved.

The Hvid type motor may be made either four-stroke or two-stroke cycle, although all the motors being manufactured at present are of the four-stroke cycle. Ignition is secured as in Diesel motors, by the heat of compression, but unlike Diesel motors, the Hvid motor requires no air compressors or complicated air valves and piping for introducing the fuel into the cylinder. The upper picture is a cross section of the Hvid injector valve, the extreme end of which projects into the combustion chamber and operates as follows:

On the suction stroke of the motor, pure air only is admitted to the cylinder through the inlet valve (No. 1). While this air is being drawn into the

cylinder, the fuel valve (No. 2 in the illustration) is mechanically opened and some fuel flows out of a hole (No. 3) into a steel cup

(No. 4), the amount of oil being controlled by the needle valve (No. 5). The fuel valve (No. 2) closes again just before the end of the suction stroke and seals hole 3.

The compression stroke follows next and the air previously admitted to the cylinder is compressed to about 450 pounds per square inch, which renders it incandescent. The compression pressure enters cup 4 through holes (No. 6) at the bottom of the cup, and a minute amount of the oil lying at the bottom of the cup is ignited by the incandescent air. The combustion which takes place gives rise to a pressure within the cup far in excess of the compression pressure in the cylinder, and the oil lying at the bottom of the cup is forced out of cup 4 through holes 6 into the incandescent air in the cylinder, where it ignites spontaneously; the pressure arising from combustion forces the piston forward on the working or expansion stroke.

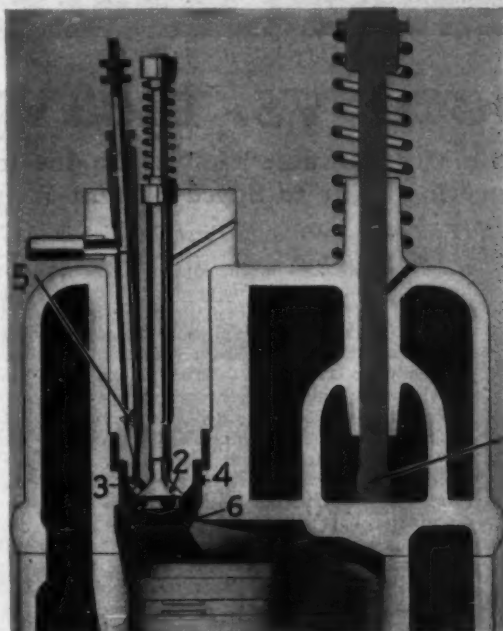
Even though high compression engines of the Diesel type have been made for the last fifteen years, the average layman knows very little about them, and since Hvid's type is similar to Diesel's, in that ignition is secured by the heat generated in the cylinder during the compression stroke, it would be well to make a brief comparison of the Diesel engine with conventional types of gasoline engines and then to compare the Hvid type with the Diesel:

The first great difference between Diesel engines and the conventional types of gasoline engines, with which most of us are familiar, is that of compression. Diesel engines have compression pressures ranging from 410 to 510 pounds per square inch, while conventional types of gasoline and kerosene engines are limited according to the fuel they use to compression pressures which will not give rise to temperatures sufficient to ignite the charge prematurely—usually from 50 to 80 pounds per square inch.

The second difference is the method of introducing the fuel into the cylinder. The Diesel draws in through its inlet valve pure air only, and then at the highest point of compression fuel is forced into the cylinder against the compression pressure by means of compressed air, while conventional types of gasoline engines mix the air and fuel outside the cylinder by means of a carbureter and draw the mixture into the cylinder on the suction stroke.

The third difference is the method of igniting the charge. The Diesel engine accomplishes this by means of the heat generated by compression, while the conventional types use some form of an electric spark with its attendant

(Continued on page 56)



Cross section of cylinder head of the Hvid type motor. An explanation of the numbered parts will be found in the accompanying text



Two-cylinder Hvid type marine motor developing 20 h.p. Motors of this type will operate on any of the usual fuels of low volatility, and may be built in units as low as 1 h.p.



High-Speed vs. Heavy-Duty

An Interesting Discussion of the Most Suitable Kind of Engine for Installation in a Cruiser—Recent Developments in Engineering Point to Speedy, Light-Weight Motor as Ultimate Type

THE PRIZE CONTEST—Answers to the First Question in the November Issue

High Speed Preferred

(The Prize-Winning Answer)

THE chief requisite of a cruiser is reliability, and the result to be attained in selecting a suitable engine is generally the highest economical speed compatible with perfect dependability.

A few years ago it was generally understood that the high-speed type of motor was taboo where the absolute reliability necessary for cruising service was concerned. Conditions have been gradually changing, however, and, although the slower type engines are still the most generally accepted type for cruisers, it is because the commonest style of cruiser in service at present is the heavily built, full-bodied, bilge bottom boat, which cannot be driven outside of closely restricted limits, say from 7 to 10 miles per hour. For this type of boat the heavy-duty engine is eminently suitable.

A round-bottom cruiser having rather fine lines, and a stern which will not settle or drag excessively when under way, will drive more economically without any sacrifice of dependability if powered with a medium-duty motor. The resistance of such a boat is less than in the heavy, full-bodied type; consequently the natural speed of such a boat is greater—say from 10 to 15 miles per hour.

The past year has been an important one in the development of the high-speed cruiser, and there are now a great number of cruisers, fully equipped with every modern cruising convenience and entirely seaworthy, which are powered with high-speed motors that have, when installed in such boats, demonstrated a dependability on a par with the slower speed motors. Therefore, if a cruiser has been designed and built for express service, a high-speed motor is the proper one for the boat, and will drive it at any speed more economically and with the same degree of reliability than the slower, heavier types of engines.

The gist of the foregoing is that in deciding the type of motor for a cruiser, the determining factor is the capabilities of the particular boat, arrived at by careful consideration of its essential features—particularly, type of hull (V or round-bottom), the lines and type stern, and weight. The proper engine will be of the type described by the service of which the boat is capable.

G. W. BROGAN, N. Y. C.

Depends on the Hull

WHETHER to use a heavy-duty, medium-duty or high-speed engine in a cruiser would depend almost entirely on the amount of power to be installed and the speed required.

It is hardly necessary at this time to install a heavy-duty machine in order to obtain ex-

treme reliability, as medium-speed and even high-speed engines are now produced that can be relied on to give the best of service at all times. In the ordinary pleasure boat they will outlast the hull if well cared for.

Usually the best engine to install is one that will drive the hull at the desired speed with the greatest economy of fuel. As the usual practice is to connect the propeller direct, without reducing gears, etc., it is necessary that the engine deliver its power at the number of revolutions at which an efficient propeller of proper size and pitch may be used.

In a general way, for heavy boats to be driven at low speed, a heavy, slow-speed two-cylinder engine is best. This will handle a low-pitch propeller of large diameter and liberal area which gives best results on a heavy boat.

Where a greater speed is required, ranging from about 9 to 14 miles, a medium-speed four-cylinder machine would be most suitable. The propeller required will be no larger than with the slow-speed machine—possibly smaller and having slightly more pitch. The extra revolutions at which this propeller is driven enables

it to utilize the increased horsepower of the engine.

When still greater speed is required, ranging from 15 miles up, high-speed engines become necessary in order to obtain the required power without undue weight and also to avoid using a propeller with an extreme pitch ratio.

In selecting an engine the propeller to be used should also be considered in relation to the hull and speed required, because if it should be necessary to use with some particular engine a propeller not suited to the hull, economical driving cannot be obtained.

Before the selection of the power plant for any boat is undertaken there should be a clear understanding of the principles upon which the screw propeller works. Something should be known of the amount of area or diameter of wheel required for certain hulls, and of the amount of slippage allowable where efficiency is to be considered. An understanding of the pitch ratios that have proved most practical for different speeds should also be required.

As an example in what not to install, suppose we have a small cruiser and decide to use a high-speed motor of, say, four cylinders and of only sufficient power to drive the boat at about 8 miles. First, it will probably be necessary to use a propeller having a diameter and area too small for the hull, in order that the engine may turn at the indicated speed. Second, if a powerful wheel of reasonable pitch were used the slippage would likely be excessive on account of the high engine speed and low boat speed.

Recently several installations of medium- or high-speed engines have been made in extremely heavy boats, using reduction gears so as to turn a large propeller at about one-half engine speed. If the gears can be made so as to give thorough satisfaction then it may be possible to use light, high-speed machines to advantage in a cruiser.

C. H. CHRISTIE, Saginaw, Mich.

Reduction Gearing a Factor

THAT high rotative speeds and efficiency are synonymous from the engineer's intellectual qualifications is evident from the trend shown in the advances made in marine motor design.

Contrary to the preconception of the uninitiated that high-speed motors are expensive of operation, the distinctive qualities of efficiency and economy are so pronounced that it is doubtful that the future will experience a continuance of the heavy, ponderous, slow-moving motors which are now seen in marine service.

Previous to any analysis of the representative features of economy and efficiency of the high-speed balanced motor, it will be noted that motors with rotative speeds up to 3,500

Questions for the March Issue

1. What devices and stunts have you found most successful in grinding valves?
Suggested by Leashproof, New York City.

2. Explain or illustrate any precautions or devices for preventing the loss of an anchor on a rocky bottom.
Suggested by R. M., Ithaca, N. Y.

3. Describe and illustrate the best method of constructing the hinged water-tight hatch over the motor as used in a modern runabout.
Suggested by E. J. S., Springfield, Mass.

Rules for the Contest

Answers to the questions, addressed to the Editor of MoToR Boating, 119 West 40th St., New York, must be (a) in our hands on or before January 20th, (b) about 500 words long, (c) written on one side of the paper only, (d) accompanied by the senders' names and addresses. (The name will be withheld and initials or a pseudonym used if this is desired.) Questions for the next contest should reach us on or before the 20th of January. The Editor reserves the right to make such changes and corrections in the accepted answers as he may deem necessary.

The prizes are: For each of the best answers to the questions above, any article advertised in the current issue of MoToR Boating, of which the advertised price does not exceed \$25, or a credit of \$25 on any article advertised in the current issue of MoToR Boating which sells for more than that amount. (There are three prizes—one for each question—and a contestant need send in an answer to but one if he does not care to answer all three.)

For each of the questions selected for use in the next contest, any article advertised in this issue of MoToR Boating, of which the advertised price does not exceed \$5, or a credit of \$5 on any article advertised in this issue of MoToR Boating which sells for more than that amount.

When you send in your answers you must state what you will take for a prize should you win one

r.p.m. are the accepted practice in automobile design, where they have been developed to a high state of perfection and are using advantageously this phenomenal velocity with excellent performance and uncompromising economy.

If the high-speed engine possesses factors of such importance as to become the accepted type in this field, there are no apparent reasons why it may not be employed in marine practice, if we are to possess the distinct advantages of such desirable qualities.

Reduction gearing or silent chain driving interposed between the motor and propeller shaft may be necessary to secure efficient propulsion for medium speeds, yet this feature has its advantages, for it permits of variations in the installation, besides being an ideal meth-

od of personal experimentation to increase or decrease the revolutions of the propeller shaft to attain better performance

Prominent among the features of the high-speed type are improved carburetion, flexibility, lighter reciprocating and revolving parts, eliminating to a marked extent vibration and decreased weight and making a more easily started motor. Better carburetion is secured in this type because of the minimum of time elapsing between vaporization and ignition, reducing the time interval during which there is likely to be condensation of the gasoline vapor.

Any attempts to minimize the undesirable elements of friction and vibration (inseparable, to some degree, from an internal combustion motor), can only be effected by decreasing the weight of those reciprocating and revolving masses which convert the expanding gases into rotative energy.

Some recent installations aboard cruisers of

high-speed multiple-cylindere motors disprove the belief that this type is not applicable for normal service. The reduction gearing interposed in the drive, similar in principle to its application in motor vehicles, secures the necessary reduction in propeller speed, and the excellent results of these installations would seem to indicate that the marine motor of the future will be of this type.

G. A. L., Washington, D. C.

Reliability First

THE type of engine for a cruiser depends very much on the type of boat. The boat may be heavy and slow, of great beam and draft, or a medium type, of modern (Continued on page 56)

A Place for Your Shore Clothes

The Perplexing Problem of How to Dispose of Your Glad Rags When Cruising in an Open Boat Satisfactorily Settled—Various Methods of Keeping Them Neat and Accessible

THE PRIZE CONTEST—Answers to the Second Question in the November Issue

A Novel Arrangement

(The Prize-Winning Answer)

STORING shore clothes aboard the small open boat so that they are compact, neat and readily accessible at all times will be found easy to accomplish if an arrangement such as the one illustrated on page 28 is used. A locker of dimensions approximately 40 x 21 x 14 inches can be made to accommodate two or three suits, hat, shoes, toilet articles and other incidental wearing apparel necessary for the boatman's land activities.

Four brackets, a hook and two bars, the last to be either brass or wood, are all that is necessary. The brackets should be made of oak and three holes should be drilled (as shown) to receive the bars, the position of which can be changed from holes 1 to 2 or 3 as the quantity of clothes to be stored may require.

These brackets should be placed as shown on the under side of the lid of a locker opening sideways. Opening in this manner is necessary to secure sufficient length to accommodate a coat stretched out. When the lid is up in position clothes are easily removed without digging to the bottom of the pile and can be placed away just as readily. The bars not only serve to keep the coats in position, but a couple of pairs of trousers can be placed on them without any fear of their becoming creased. Neckties can be hung in a like manner.

The above contrivance will occupy about half the locker space. The lower half can then be partitioned off to receive hats, shoes,

etc., and when the lid is up everything will be in view and very much get-at-able.

J. K. B., Brooklyn, N. Y.

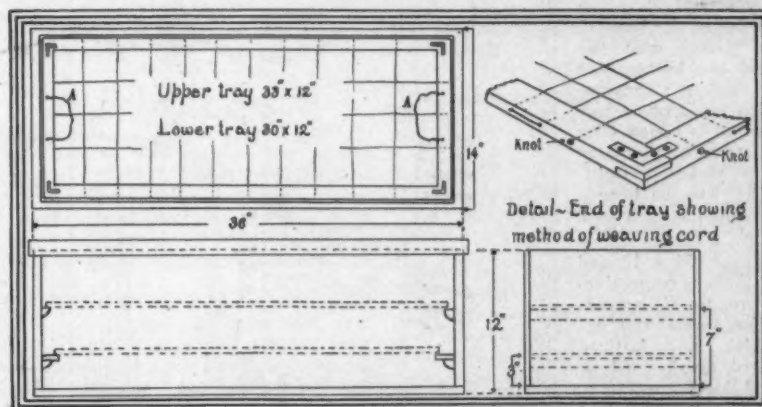
Making Use of Your Suit-Cases

PROBABLY the best place to carry shore clothes on an open boat would be in a suit-case. This doesn't mean that each individual is to arrive bringing a suit-case to be stored any old place on board.

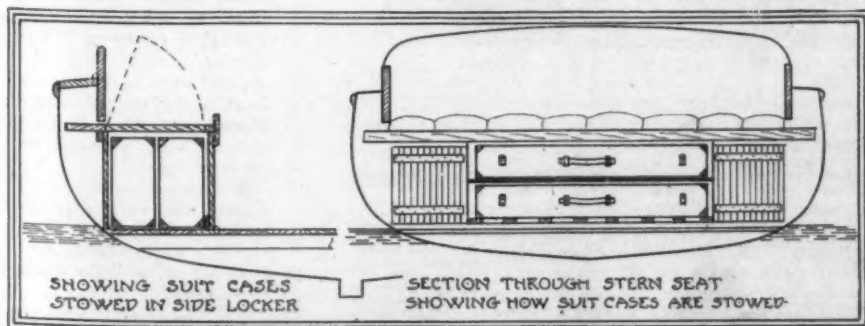
As a suit-case is intended for carrying

clothes, its interior is planned and constructed accordingly—which is more than can be said of many boat lockers used for this purpose.

Suppose we used the suit-case to hold the clothes and built the locker to hold the suit-case. The advantage would be that the clothes could be packed and kept in better condition than if placed directly in a special locker. When they were wanted the case could be taken out and placed in a convenient position. If they were stowed directly in the locker it would be necessary to get down on the floor to get them out, or to stow them away properly if the locker opened from the side. If the locker opens from the top there is always the



Space for a clothes box measuring 3' x 14" x 12" may be found in almost any open boat, and Mr. Murphy arranges his with two trays for accessibility's sake



Mr. Christie's locker is made to fit his suit-cases, in which the clothes are packed

possibility of dirt or even water leaking down on them.

The best location for such a locker constructed to hold one or two suit-cases would depend greatly upon the arrangement of the interior of the boat and also on what lockers or spaces were already occupied with other necessary equipment.

Suit-cases are made in various sizes, and one about two feet long, thirteen inches wide and six to seven inches thick would be a good size for this purpose. Possibly a locker two feet long can be arranged to hold two of them, and this would provide storage for all the shore clothes usually found necessary on an open boat.

A convenient location would be under the cross seat at the stern. The front could be hinged to open in the form of two small doors, or hinged at the bottom so as to drop down. The interior should be lined with light wood so as to hold the suit-cases nicely. A light shelf between the two will allow of either being taken out without disturbing the other.

A piece of oilcloth or other waterproof material tacked to the upper part of the locker so as to cover the suit-cases would prevent their getting wet in heavy weather.

C. H. CHRISTIE, Saginaw, Mich.

A Well-Arranged Clothes Box

THE average open boat has space enough in it to stow away a box three feet long, fourteen inches wide and twelve inches deep. It may be placed under the forward or the after deck, or it may be incorporated in the locker space and serve as a seat. It may be made stationary or movable, the former condition being preferable.

The space having been found, a clothes box made according to the illustration on page 27 will be found to be entirely satisfactory. It will carry the street clothes (coat and trousers), linen and underwear of four men. The tray effect makes it possible to get at the desired articles without unpacking, as would be the fact with a suit-case. Furthermore, the size need not be the size herein stated, for it is the minimum size that is practical.

The sides of the box are made of $\frac{1}{4}$ -inch, while the ends and the bottom are $\frac{3}{4}$ -inch, cypress. The cover is also made of $\frac{3}{4}$ -inch cypress and is edged with $\frac{1}{2}$ -inch strips of the same wood to make it tight-fitting. It can be hinged and furnished with a lock if desired.

The trays, 33 x 12 and 30 x 12 inches, respectively, are made of cypress $1\frac{1}{2}$ inches wide and $\frac{1}{2}$ -inch thick, and latticed with hard finish cord or light cod line according to the diagram. Fifty feet of cord will be sufficient.

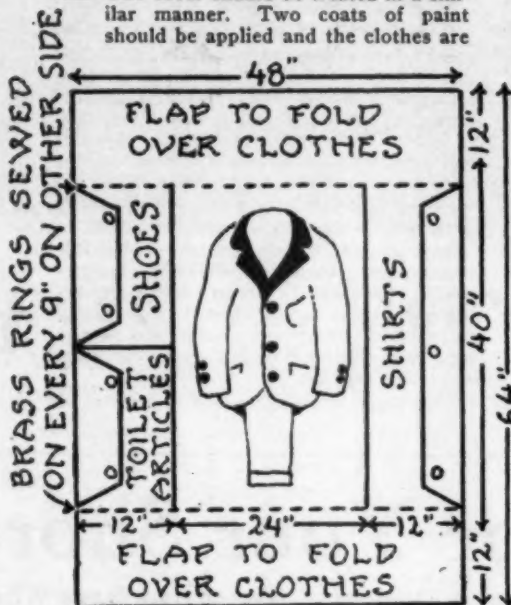
Two lifting straps (AA) are made with the same cord. Their purpose is self-evident.

The shelves for the top tray are two pieces of 1-inch quarter round, $12\frac{3}{4}$ inches long, while those for the lower tray are $12\frac{3}{4}$ x $1\frac{1}{2}$ x $\frac{1}{2}$ -inch pieces superimposed upon quarter rounds.

The upper compartment is best for the coats. They can be folded full length with little danger of being wrinkled to any great extent.

It is best to cover the

entire box with drilling, pulling it over the top edge and tacking it on the inside of the box. The cover should be treated in a similar manner. Two coats of paint should be applied and the clothes are



Dimensions of a canvas clothes carrier suggested by Mr. Dwyer

thus protected from the rain from above and the bilge water from below.

A canvas bag measuring 16 x 24 inches made out of No. 12 canvas will carry the shoes of the party and can be stowed almost anywhere.

If not packed to its capacity, the box is an excellent place to carry charts, extra dry cells and toilet articles, the last being placed in a shallow pasteboard box.

JAMES E. MURPHY,
New London, Conn.

A Canvas Carryall

THE clothes carrier illustrated herewith was made out of 8-ounce khaki canvas and when opened measured 48 x 64 inches. Two 12 x 40-inch pieces were used to make two long pockets, and one of the pockets was stitched through the center to make two smaller pockets measuring 12 x 20 inches. All pockets were fitted with flaps to button down. Where the dotted lines appear on the diagram, $\frac{3}{4}$ -inch brass rings were sewed on the opposite side to that on which the pockets were sewed, and through these rings $5/16$ -inch cotton rope was drawn to tie the carrier when rolled up.

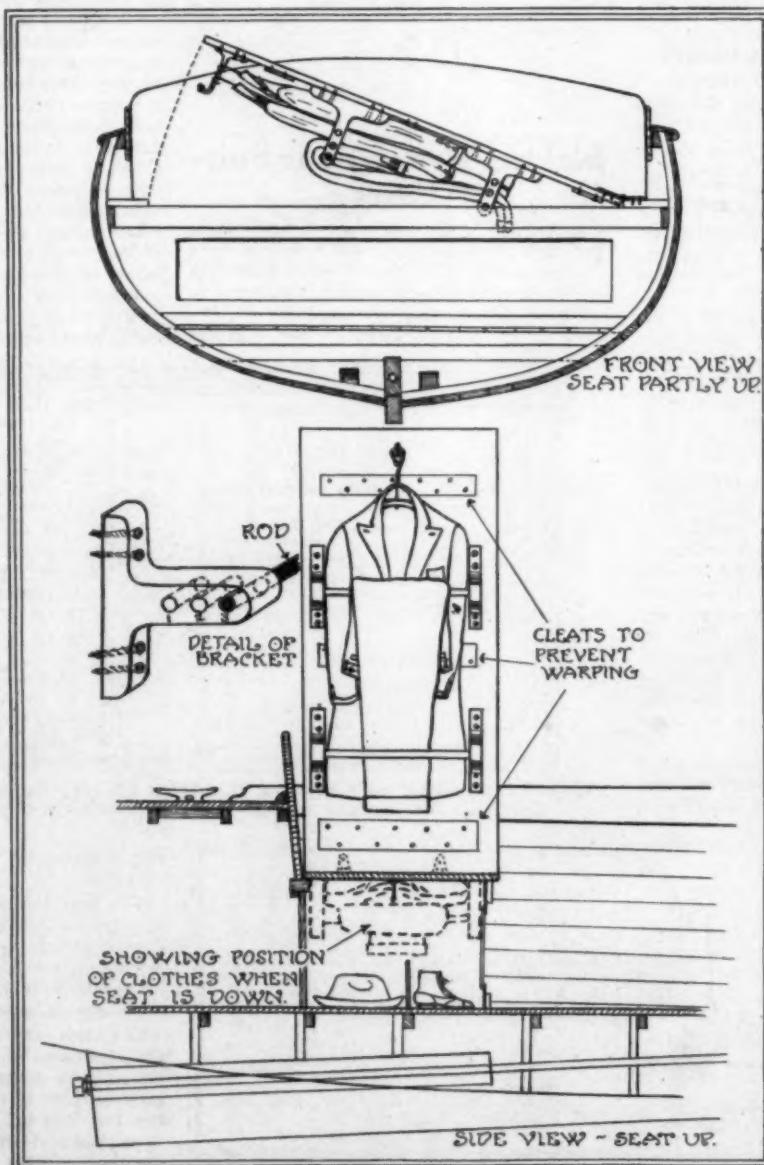
When I was ready to take my shore clothes aboard the boat, I first laid my coat in the center section between the two long pockets, and then placed my trousers flat inside of the coat. My outside shirt was laid in the long pocket and my shoes were stowed in one of the small pockets. Any collars, ties, handkerchiefs, etc., were lodged in the other small pocket. If a friend came along, the carrier could also accommodate his clothes on a pinch.

When my clothes were all laid away, I folded both of the 12-inch flaps back on top of them and then rolled the carrier up so as to make it approximately 40 inches long and 14 or 15 inches in diameter. The cotton rope run through the brass rings was then tied at both ends and a third rope was tied around the middle of the roll.

The whole could then be tossed into the row-boat without fear of its breaking open and spilling the contents. The carrier could then be stowed very easily on my boat, and if the rain came down, not the slightest damage was done to my shore clothes.

The carrier described above was very easy to make, easy to carry, practically water-proof and took up very little room on my boat.

C. E. DWYER,
Tompkinsville,
S. I., N. Y.



As suggested by J. K. B., the clothes locker is part of the stern seat. Accessibility is an important feature

The Boarding Steps

Important Part of a Cruiser's Equipment Which Is Sometimes Omitted Through Lack of Room or the Difficulty of Securing a Serviceable Design—How to Construct a Set

THE PRIZE CONTEST—Answers to the Third Question in the November Issue

Dual Purpose Boarding Steps

(The Prize-Winning Answer)

THE necessity of a flight of boarding steps was vividly brought to me last summer during a trip on my 36-foot cruiser. Supposing that everybody was born with a caul and had web feet like myself (apologies to H. H. Parker), I allowed my wife to come aboard unassisted while at anchor, with the following result: She made the dinghy fast to the gangway all right, but in climbing aboard, pushed the dinghy from under her, leaving her hanging to the railing until my arrival on the scene. A bad scare, wet feet and skirts, and a command to build a pair of steps. In landing now I run the dinghy right under the steps, which are about twelve inches above water at the lowest part. This allows the passengers to step from the middle of the dinghy to the bottom step, eliminating the possibility of tipping.

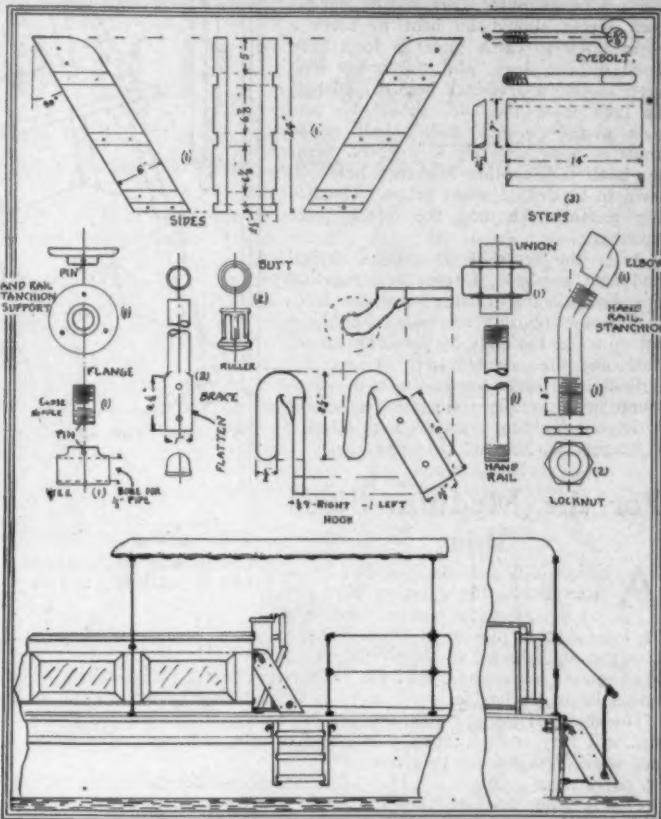
In submitting this sketch of my steps, I call attention to the dual use to which they are put. When under way or docked they are available for mounting to the top of the cabin from the deck, making it easier for the gentler sex. In the sketch I have endeavored to show every detail without needless sizes, as no two boats would need the same. I recommend no special material, leaving this to the choice and pocketbook of the builder.

The steps and sides should be of some good weather-resisting material and should be well mortised to take the weight from the screws which are used to hold them together. The hooks for holding the steps to the side of the boat and the cabin bulkhead should be well forged and should be fastened with small bolts, as screws will work loose with constant use. Small rubber butts for the ends of the step braces protect the boat's side and can be procured from drug stores which sell crutches. A hand rail is optional, but is quite an aid to the timid landlubbers. It should be of half-inch pipe. The union on one end fastened to the railing and thread end fits the

elbow on the stanchions. The stanchion is of half-inch pipe, and is held in a support made of pipe fittings. Two lock nuts fasten it to the support and make it easily removed. The flange and tee on the support are pinned to a close nipple to prevent unscrewing.

To show the steps in their dual use I have made them in the drawing on the same side of the boat. When in actual service as boarding steps, they are, of course, hung on the starboard side. Since installing these steps, fear and timidity have left the Mrs. Captain and she approaches the boat now with pleasure.

W. C. CARTER,
Washington,
D. C.



Working drawings of a flight of boarding steps prepared by Mr. Carter. These steps are also used for gaining access to the forward deck

A Folding Set

BOARDING steps, though very useful, are not seen on every cruiser for various reasons, chiefly because spare room is generally at a premium on small craft. There are, however, many times and places when it is necessary to make use of a tender and it is then that the convenience of the boarding step is appreciated.

The writer has a flight of these steps which do double duty. When not being used over the side of the boat, they are hanging from the coaming inside the cockpit next to the cabin bulkhead and serve as a very convenient way of getting on to the cabin deck.

The side pieces of the steps are about thirty inches long, one inch thick, and vary in width from ten inches at the widest part to seven inches at the narrowest, thus allowing the lower step to project beyond the top one and making it easier to descend. The steps are six inches wide, sixteen inches long, and about 3/8-inch thick, mortised into the side pieces nine inches apart and are fastened from the outside by three long brass screws at each end. The bottom step is so placed that it hangs about fifteen inches from the water. Brass angles under each step act as braces, making it very rigid.

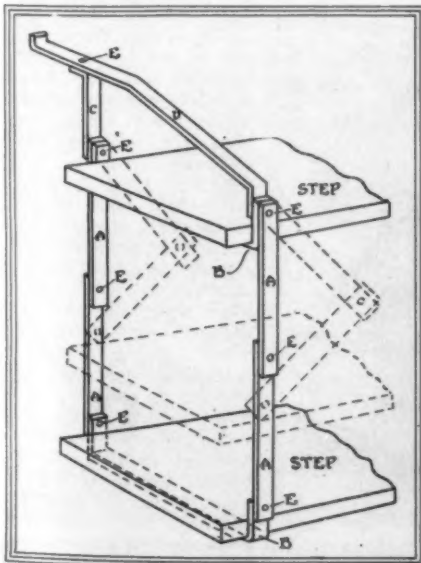
A half round notch is cut into the inside edge of the side pieces about four inches from the top to fit over the molding or ribband at the edge of the deck. This acts as a support for the steps as well as a check to keep them from being lifted off. The sides are made

long, nearly reaching the water, so as to keep the tender from getting underneath and lifting them.

If, however, storage space is a factor to be considered, strong serviceable steps may be made that will fold so as to occupy little space. All that is necessary is the boards (either mahogany or oak) for the steps, a dozen 1-inch brass screws, fourteen brass bolts of 3/16-inch diameter and 1 inch long and some strips of brass. Get two pieces of board 6 inches wide, 1 inch thick, and 16 to 18 inches long and square and smooth them. You will now want several pieces of 3/16 x 1/4-inch flat brass of different lengths. To make sure that the brass will not crack in bending, heat it red where the bend is to be made and plunge it into cold water immediately—which will soften it.

By referring to the drawing at the left the construction will be clearly understood. Take four pieces (B) 10 inches long and drill a 3/16-inch hole in each end, 4 1/2 inches from the center of the strip, making them 9 inches apart, and then bend up the ends at right angles in the shape of a shallow U to fit over the steps. Holes should also be drilled to take wood screws to fasten these pieces on the under side of steps.

Next take eight pieces (A) 6 inches long and drill a 3/16-inch hole half an inch from each end. These form the connections or up-rights between the steps and are pivoted together at one end. The other ends are pivoted to the pieces already bent around the steps.



Folding steps suggested by Mr. Megill

Four more pieces will be needed; two (C) 6 inches long and two (D) 12 inches long. These form a sort of bracket from which the steps hang. The 6-inch pieces should have a 3/16-inch hole drilled half an inch from each end and one end bent over about an inch and a half to form a right angle. One end of the 12-inch pieces should be bent to form a short hook to catch under a loop fastened on the deck, and the other end, after having a 3/16-inch hole drilled half an inch from the end, should be bent over about an inch and a half at an angle of approximately 45 degrees. Near the hook end, another 3/16-inch hole will have to be drilled when properly located for riveting this and the 6-inch piece together.

After the brass strips are all drilled and bent to shape, fasten them together (as shown in the drawing) with the 3/16-inch bolts (E). The nuts should be set up snug, the ends of the bolts cut off flush and then riveted over to keep the nuts tight. Slight variations and refinements will doubtless suggest themselves to anyone building a set of these steps.

ALFRED L. MEGILL, Brooklyn, N. Y.

For the Medium-Sized Boat

ASSUMING that the boarding steps intended in the question were not of the gangway type as used only on large yachts, the ones which I have designed are adapted to the average medium-sized cruiser where the use of the former type would be impracticable.

The shape of the uprights, number of steps, etc., will vary with different boats, and so no definite dimensions can be given to cover these points.

Oak is about the best wood to use for this work. The steps should be set in grooves rabbeted in the uprights and fastened with screws as shown. In order to maintain rigidity, fasten two angle braces on the under side of the ends of each step; size 3 x 3 inches or 4 x 4 inches will do very nicely. If the lower step extends beyond the one above about two inches as shown, they will be more easily ascended and descended.

The whole arrangement is hooked by means of the band iron on to two cleats screwed in the deck. In purchasing the cleats, be sure that the space between the lugs will accommodate the width of the band iron.

These steps are very quickly hooked on and off, and since they must be swung outward from the bottom to disengage the hooks, they cannot become accidentally unshipped by hitting a tender or wharf. A thin piece of rubber tacked upon the surface coming in contact with the hull will protect the latter. If the steps are finished in the natural wood, the effect obtained thereby is more desirable than if painted. If possible, have all the metal parts galvanized or made of brass. When these steps are well constructed

they should outlast the life of the boat.

H. A. MOTZ,
Philadelphia, Pa.

practically any bilge. The prop or brace portion at the bottom tends to hold

the steps on an incline which will appeal to the user. The frame is made of 3/4-inch brass pipe, the ends being bent to hook over the gunwale.

In the case of a flush deck, standard flagpole sockets of the proper size may be positioned on the deck to receive the ends of the frame, as shown in Fig. 3. The steps are supported in the frame by means of brass pieces measuring about 3/8 x 3/8 inches, the ends being turned round as shown in Fig. 2.

A piece of 1/2-inch pipe is used for a spreader, supported in 3/4 to 1/2-inch reducing tees. The frames may be easily bent to form by first filling with fine sand and then gripping between wood pieces in a heavy vise. In most pipe shops, however, there are bending fixtures for such jobs. In assembling, the spreader is screwed well into one tee and then backed into the other. In some cases, small welded chain will be found preferable to the rope. Either will permit the steps to collapse for towing.

J. C. CAVANAGH, Meriden, Conn.

Extension Steps

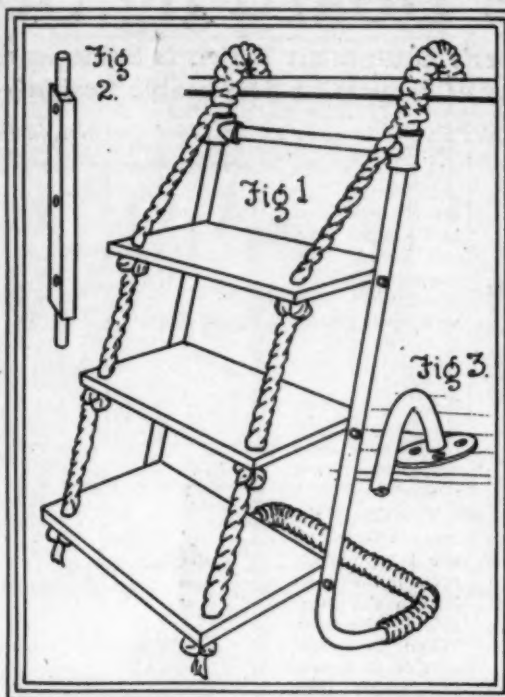
A TYPE of steps that has given good service and been found quite convenient is illustrated herewith, and consists of an upper part with two treads, hooking over the rail which is protected at these points on both sides of the boat with a brass plate, and a rubber tread to prevent slipping. This is the part usually used when at the dock, but when longer steps are required a lower part can be hooked to the bottom end of the upper part, giving two more treads and reaching down to within four inches of the waterline. This is a convenience when the tender is used, but more of one when you are trying to climb aboard after a plunge from the boat.

The method of hooking the two parts together and the construction of the steps is clearly shown, so that only a brief description will be given.

They are made of white oak with galvanized fittings. One and a quarter inch wood is used. The treads are set a quarter of an inch into the side pieces, and fastened with three screws on each side, and two bolts running from side to side through the grooves in the bottom of the treads. They are then bound

with half oval iron fastened with flat head screws. Any blacksmith will bend and weld the iron to the shape required. After fitting and drilling the holes for the screws, have the iron galvanized. Although not absolutely necessary and not shown in the illustration, it might be advisable to make the upper step slightly narrower than the bottom one to facilitate climbing them. When carefully constructed these steps are very rigid, and with several coats of varnish and the rubber treads tacked in place, present a good appearance and will give good service.

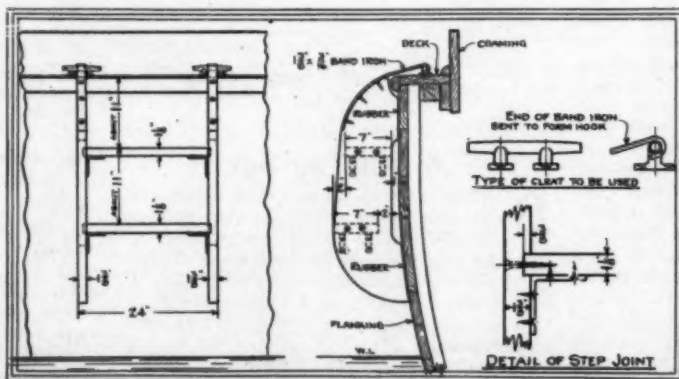
L. R. KELLEY,
Philadelphia, Pa.



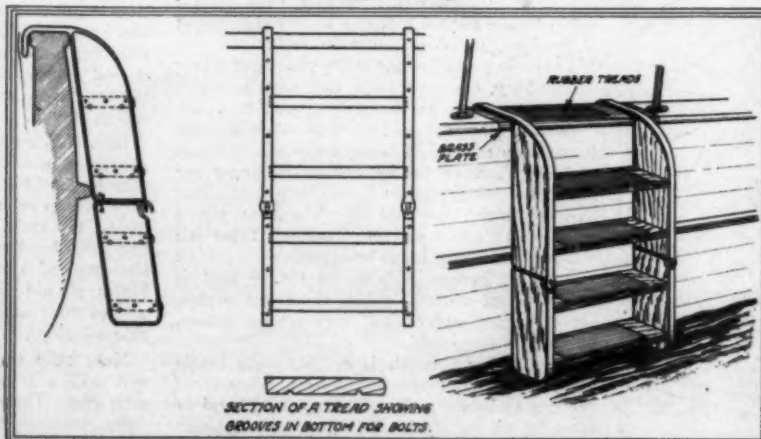
Collapsible steps devised by Mr. Cavanagh which will fit against the side of a boat of practically any bilge

For Use on Any Cruiser

A GREAT advantage of boarding steps made in the manner shown in the drawings lies in the fact that such steps will set well against the side of a boat of



Mr. Motz's steps hook on in such a way that they cannot be accidentally dislodged



The extension feature of Mr. Kelley's steps makes them especially valuable when one is swimming over the side



The 1917 40 H.P. Erd

A Distinctive New Unit Power Plant Which Is Stated to Mark a Great Advance in Marine Motor Design and Construction—Conscientious Attention Devoted to Its Assembly and Inspection

THE 1917 model unit power plant just placed on the market by the Erd Motor Co., of Saginaw, Mich., is declared to mark a new epoch in marine motor design. It is manufactured by thoroughly modern methods, and is stated to be of a distinctly new type which has been proven satisfactory by the most exacting tests.

Of the valve-in-head type, it has four 4 x 6-inch cylinders and develops its greatest efficiency at comparatively low speed. It delivers 30 h.p. at 900 and 40 h.p. at 1,200 r.p.m., and is adapted to cruiser, work boat and speed runabout service. All valves and push rods are entirely enclosed, and the covers are quickly removable for inspection or adjustment. The crankshaft is drop-forged from high carbon steel and is heat-treated, while the camshaft is turned up from a solid bar and has its cams case-hardened to a depth of 1/16 inch.

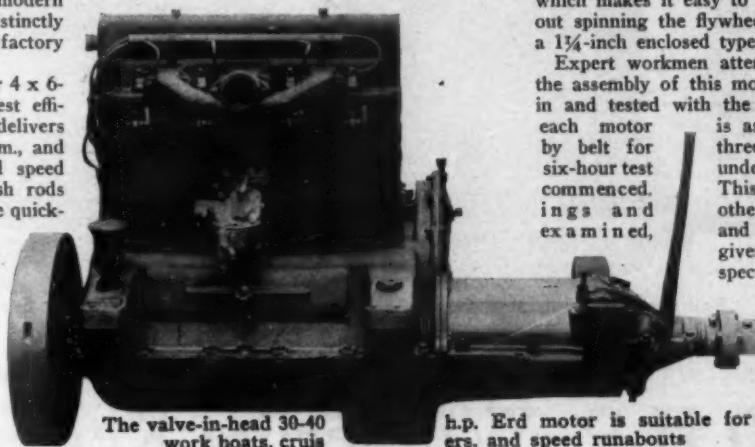
The main bearings are large with interchangeable bushings cast from special heavy pressure metal, and the connecting rods, which are of

the drop-forged I-beam type are fitted with special bronze-backed bushings that are also interchangeable.

The oil system gives a positive force feed

to all the bearings, and an oil level indicator is conveniently placed for showing the amount of oil in the reservoir. The magneto is a high tension Dixie with an impulse starter which makes it easy to start the motor without spinning the flywheel. The carbureter is a 1 3/4-inch enclosed type Kingston.

Expert workmen attend to every detail of the assembly of this motor, and it is worked in and tested with the greatest care. After each motor is assembled, it is run in three hours before the under its own power is commenced. This completed, the bearings and other parts are carefully examined and the official O. K. is given by the head inspector before the motor is allowed to be shipped from the factory. Painting is done by expert operators of modern paint spraying machines.



The valve-in-head 30-40 work boats, cruis

h.p. Erd motor is suitable for ers, and speed runabouts

New Van Blerck Shows Improvements

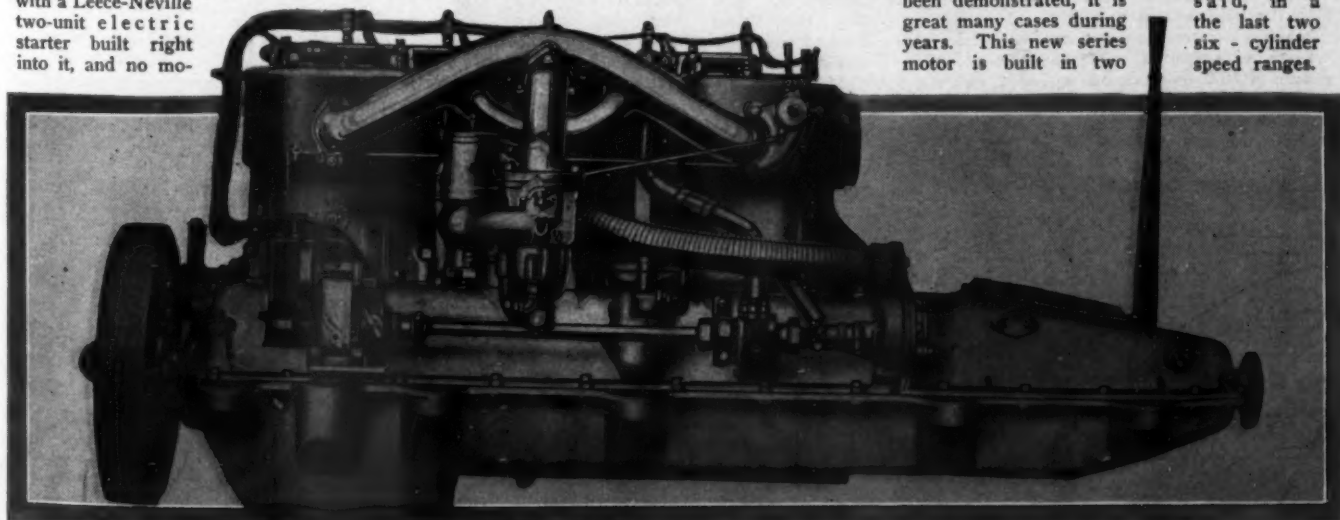
Built-in Leece-Neville Starting System Now Inseparable From Its Equipment—Improved Circulating System, Oil Cooling Device, and Air Pump for Fuel Feed Other Interesting Features

THE new series six-cylinder Van Blerck, manufactured by the Van Blerck Motor Co., of Monroe, Mich., and shown in the accompanying illustration, is now ready for shipment. It is regularly fitted this year with a Leece-Neville two-unit electric starter built right into it, and no mo-

tors will be sold that are not so equipped.

The main changes are the enclosure of the flywheel and improvement in the water pump and circulating systems, and in the equipping of all motors of this cylinder number with an

oil cooling device. An interesting addition to the regular equipment is that of an air pump for fuel feed that is capable of pumping from one to seven pounds of air at the will of the operator. The necessity of such a pump has been demonstrated, it is said, in a great many cases during the last two years. This new series motor is built in two six-cylinder speed ranges.



The new series six-cylinder Van Blerck motor is built in two speed ranges, the types differing chiefly in the valve timing and the amount of compression maintained. Cast iron in place of aluminum is used on the slower speed model wherever convenient

The Largest Aeronautic Motor

The New Knox Twelve-Cylinder Aero Motor Which Delivers 300 H. P. Is Declared to Be an Eye-Opener in This Branch of the Engine Industry—Applicable Also to Marine Service

THE Knox aeronautic motor, announced recently by the Knox Motors Co., of Springfield, Mass., is described as the largest for aeronautical purposes which has yet been built in this country. It has twelve cylinders with $4\frac{3}{4} \times 7$ -inch bore and stroke, set in a V at an angle of 60 degrees from each other, and it develops 300 h.p. at a speed of 1,600 r.p.m.

With the severe limitations imposed by air service, both as to light weight and economical fuel consumption, many problems of design have been encountered which are foreign to the average marine or automobile motor. Every part must be of more than the usual strength, and yet it must be extraordinarily light, while reliability must be absolutely assured. The makers of this motor are certain that they have fulfilled every requirement in its design, and the machine has given the highest satisfaction in tests, but at the time of writing it has not been publicly tried in actual service.

The designer, Frank H. Trego,

states that the motor is perfectly adapted to use in high-speed motor boats, as service of this nature was looked out for in the design, and that with its light weight and high power it should make a sensation in the field. Speeds

up to 70 m.p.h. have been predicted for boats equipped with this engine.

The cylinders are of special aluminum alloy with cast iron liners an eighth of an inch thick. The cylinders are cast in blocks of three and are held to the case by eight studs each. The heads are grouped in blocks of six, and the cast iron valve seats are cast integrally with the heads. Each cylinder has four valves, and the seats are so arranged as to be practically surrounded by water.

Two double Zenith carbureters, attached to the outer sides of the cylinders, are used, giving in effect a separate carbureter for each three cylinders. Except for the breather pipes no equipment is installed between the cylinder blocks, magnetos, pumps, electric starter, etc., being arranged at either the forward or after end.

The propeller is driven through gears which are supplied at optional ratios. A feature of the motor is that splines instead of keys are used for anchoring gears throughout. Many new features are embodied in the design of the lubricating and water circulating systems.



End view of the 300 h.p. Knox, showing the simplicity and sturdiness of its design, and below it a detail of the overhead valve arrangement for one block of cylinders

A 200 H.P. Wolverine Kerosene Motor

Newest Model of this Line a Six-Cylinder Engine Having Bore and Stroke of 11 by 15 Inches—Special Attachment Renders It Operable on Either Oil or Gasoline

THE Wolverine engine, shown in the illustration below, is the latest model put out by the Wolverine Motor Works, of Bridgeport, Conn., and is a six-cylinder machine with 11 x 15-inch bore and stroke, developing 200 h.p. A feature of particular interest in connection with the motor is that it is equipped with an attachment which makes it operable on either gasoline or kerosene. This attachment is a special manifold which heats the incoming kerosene and delivers it to the cylinders in a highly vaporized state. No fresh water is needed in conjunction with kerosene operation when the motor is running at half speed or below, but at full speed it is supplied automatically in the required amount

after a jet in the intake has been opened.

The cylinders of this motor are cast separately with large water jackets. The pistons are of the trunk pattern, extra long, and are fitted each with five rings above the piston pin and one below it. The connecting rods are hammer-forged to I-shape from open hearth steel, and operate in bronze boxes which are lined with babbitt on both ends, are fastened together with nickel steel bolts, and are both adjustable. The crankshaft is composed of two three-throw telescoping sections, the flanged ends being bolted together with seven one-inch nickel steel bolts.

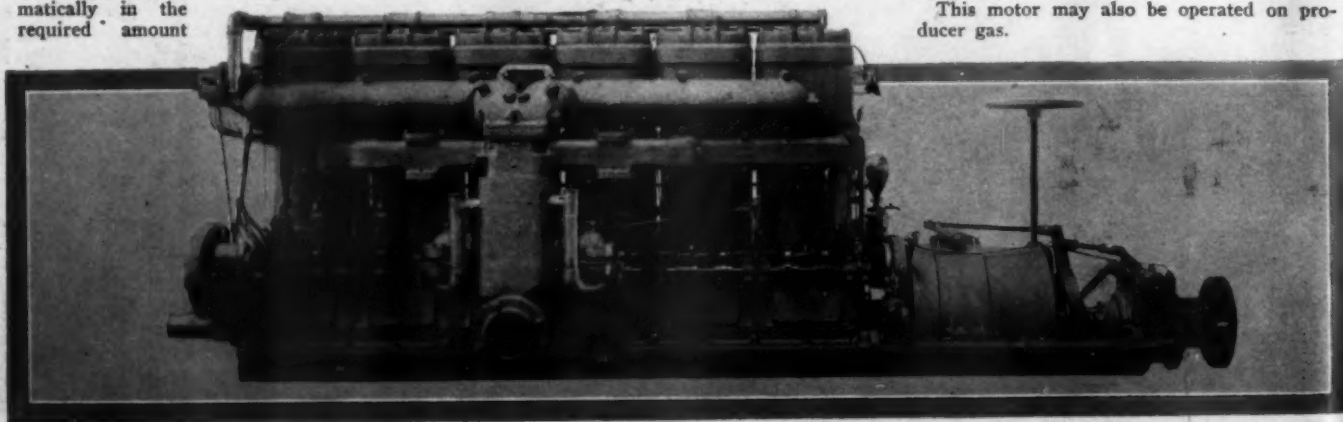
The cylinder heads are separable from the

cylinders, are light in weight, and are easily removable. The valve chamber caps are cast separately and are readily removed to give free access to the valves.

Lubrication is supplied by a two-compartment force feed mechanical oiler which supplies oil to the cylinders, pistons, upper and lower connecting rod boxes, main and end bearings on the crankshaft and the thrust bearing. The crankpin boxes are supplied with ring oilers fed with the lubricant from the force feed oiler.

Ignition is by the well-known Wolverine make and break type, and starting is effected by an air cranker. A governor is part of the equipment.

This motor may also be operated on producer gas.



Port view of the six-cylinder Wolverine, showing the kerosene manifold in position. The cylinders are individually cast with separable heads and are unusually well water-jacketed

Spark Plugs for American Marine Motors

The Marine Accessory Which Has Had to Withstand the Most Severe Service—Illustrations and Descriptions of Practically Every High Tension Plug Manufactured Today

IN considering the rapid development of the marine engine, the factor of ignition should not be overlooked, as the modern perfection of ignition apparatus contributes in no small measure to the all-around excellence of our power plants. Without this perfection, continued service no less than high speeds would be impossible.

There are many elements in an electrical ignition system, from the battery or magneto to the spark plug, and each must be as efficient as every other part, or trouble will result. To try to determine which element is of utmost importance would be as hard as to decide that old question of whether the brain or the stomach is most vital to the body's needs—without the directing brain the stomach will receive no food, and without the stomach there will be no food for the brain. So, without the battery or magneto there will be no spark,

and without the spark plug nothing with which to ignite the mixture in the cylinder. But there is no denying that the plug "delivers the goods."

The spark plugs which we have to-day are as great an advance over their prototypes of nearly a generation ago as were they over the rude, clumsy flame method of ignition. The modern ones are small, simple and cheap. They take up no room either on the engine or in the tool kit; if, through neglect, they fail to deliver a spark there is nothing about their construction which need remain a mystery to the veriest novice—in most cases he may take them down for cleaning and reassemble them in a brief interval of time; if they require replacement or if one desires to experiment with new brands, it isn't necessary to remove the brick in the chimney and reach into the secret cupboard for one's rainy day hoard to obtain the wherewithal for purchasing them.

Nowadays there need be no fear of ignition trouble if your engine is prodigal of lubricant, for there are plugs which are oil-, soot- and carbon-proof. There is no loss of compression, for every good plug is gas-proof; and you needn't worry about high speeds and feverish motors, because the cores—constructed of porcelain, mica, or any one of a number of perfectly satisfactory stone compositions—and the electrodes are put together to withstand temperatures hundreds of degrees higher than are encountered in engine service. In short, the plug of to-day is built for the motor of to-day, and the one is every whit as good as the other.

Believing that a symposium of the leading plugs on the market would be interesting to our readers for purposes of comparison, we describe and illustrate the majority of them below.

A List of Spark Plug Manufacturers

Albright Ignition Co.....	Columbus, Ga.	Hampshire Mfg. Co.....	Hatfield, Mass.	Power & Efficiency Co.....	Trenton, N. J.
Anderson Spark Plug Co.....	Baltimore, Md.	Hartford Machine Screw Co.....	Hartford, Conn.	Rajah Auto Supply Co.....	Bloomfield, N. J.
Auburn Ignition Mfg. Co.....	Auburn, N. Y.	Hertz & Co.....	N. Y. City	Randall-Faichney Co.....	Boston, Mass.
B. A. T. Co.....	Philadelphia, Pa.	Hill Insulating & Mfg. Corp.....	N. Y. City	Randall Rotary Power Co.....	Pittsburgh, Pa.
Batchelder-Gallant Co.....	Boston, Mass.	Jiffy Specialty Co.....	McKeesport, Pa.	Rapp Auto Supply Co.....	Brooklyn, N. Y.
Benford Mfg. Co.....	Mount Vernon, N. Y.	Johns-Manville Co., H. W.....	N. Y. City	Reflex Ignition Co.....	Cleveland, O.
Benton Co., L. F.....	Vergennes, Vt.	Knoblock-Heideman Mfg. Co.....	South Bend, Ind.	Rex Ignition Mfg. Co.....	N. Y. City
Bigsby-Rotary Mfg. Co.....	Cleveland, O.	Kokomo Electric Co.....	Kokomo, Ind.	Rosen & Co., A. W.....	N. Y. City
Bobra Spark Plug Co.....	Dayton, O.	Lockwood-Ash Motor Co.....	Jackson, Mich.	Sharp Spark Plug Co.....	Cleveland, O.
Boach Magneto Co.....	N. Y. City	Long Distance Spark Plug Co.....	Indianapolis, Ind.	Silvex Co.....	N. Y. City
Champion Ignition Co.....	Flint, Mich.	MacGregor Co., John.....	Rosindale, Mass.	Simplex Auto Specialty Co.....	Detroit, Mich.
Champion Spark Plug Co.....	Toledo, O.	Milwaukee Auto Specialty Co.....	Milwaukee, Wis.	Splitdorf Electrical Co.....	Newark, N. J.
Dow Mfg. Co.....	Braintree, Mass.	Mosler & Co., A. R.....	Mt. Vernon, N. Y.	Spoon Point Spark Plug Co.....	La Porte, Ind.
Eclipse Mfg. Co.....	Indianapolis, Ind.	Motor Accessories Mfg. Co.....	Marshalltown, Ia.	Star Specialty Co.....	York, Pa.
Flameless Combustion Spark Plug Wks.....	Chicago	New York Mica & Mfg. Co.....	Auburn, N. Y.	Stewart-Warner Co.....	Chicago, Ill.
Fulton Co.....	Milwaukee, Wis.	Oakes & Dow Co.....	Boston, Mass.	Superior Motor Power Co.....	N. Y. City
Gibson-Hollister Mfg. Co.....	Boston, Mass.	Perpetual Spark Plug Co.....	Dunmore, Pa.	Thomason Mfg. Co.....	North Branch, Minn.
Grossman Mfg. Co., Emil.....	Brooklyn, N. Y.	Pittsfield Spark Coil Co.....	Pittsfield, Mass.	Wesco Supply Co.....	St. Louis, Mo.
				Williams, E. Q.....	Syracuse, N. Y.

Twin-Tact and Su-Dig

The Twin-Tact spark plug, which is manufactured by the Superior Motor Power Co., of 30 Irving Place, New York City, is really two plugs in one, as it has two separate insulated sparking points, each of which is connected to its own insulated terminal post. Thus a spark can be obtained from either point, while the chief advantage of the plug is that a magneto may be connected to one terminal and a battery system to the other, and either system operated independently or both together. Before the introduction of this plug it was necessary, when separate battery and magneto systems were desired, to equip each cylinder with two plugs.

Another specialty of this company's is the Su-Dig series plug, which is a special double-electrode plug which is designed to operate in series with one of the regular type, thereby producing greater power in both T- and L-head motors, by causing two simultaneous sparks in each cylinder. Tests of these plugs are declared to have shown a 20 per cent. gain in power.

J-M (Mezger) Soot-Proof

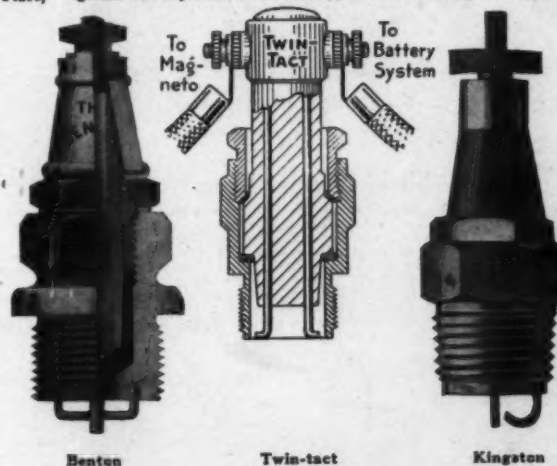
Three strong claims are made for this spark plug by the H. W. Johns-Manville Co., of New York City—that it will positively not short-circuit, that it will not leak, and that it will not break down. Short-circuiting, it is declared, is made impossible by the use of a petticoat porcelain insulator which provides a deep chamber between the center electrode

and the porcelain and another chamber between this and the shell. In service these chambers act as auxiliary combustion spaces wherein the gases are ignited and expanded tremendously, the out-rushing gas

having a marked scouring effect on the porcelain and preventing the formation of an excessive amount of carbon. The leak-proof feature of the J-M is attained by a two-unit construction which is said to make it positively gas-tight, and its durability comes from the employment of high grade materials and workmanship. The porcelain used is made from a special mixture of clays, baked and tempered by an exclusive process, and the statement is made that it will not crack when subjected to rapid changes of temperature.

Star Priming

The Star Specialty Co., of York, Pa., is manufacturing the Star priming spark plug, in which the priming feature is stated to be very simple and positive in action. The porcelain in this plug is of the very best quality, and the dome which holds it in position is stamped from sheet brass, crimped over the body of the plug, and has sufficient elasticity, taken in conjunction with the asbestos packing under the flange of the porcelain, to insure an absolutely tight joint and to provide a cushion to take up the blow of the explosion. The priming cup and wing nuts are made of brass. For priming an engine through this plug the cup is filled and the spring pressed down, whereupon the gasoline runs down through the plug around the electrode and over the sparking points. The Star priming plug is sold for \$1. A feature of the regular type Star plugs is that the porcelain is made in two parts in order to relieve it of all strain due to its assembly, and



Benton

Twin-tact

Kingston



Ezekleem

Su-Dig

Star Priming

Hampshire Rival

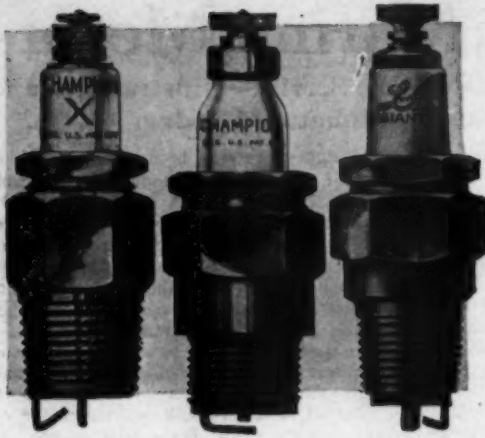
Viking

J-M Mezger

Eklips Giant

Sharp Kopper King

Center Fire



Typical Champions with Calorite cores

L-A Giant

to make it unbreakable by heat. A gas-tight joint is made by the asbestos and mica washers. The interior porcelain is removable for cleaning. The price of this plug in the regular finish is 85 cents, and \$1 when nickel-plated.

Ezekleen

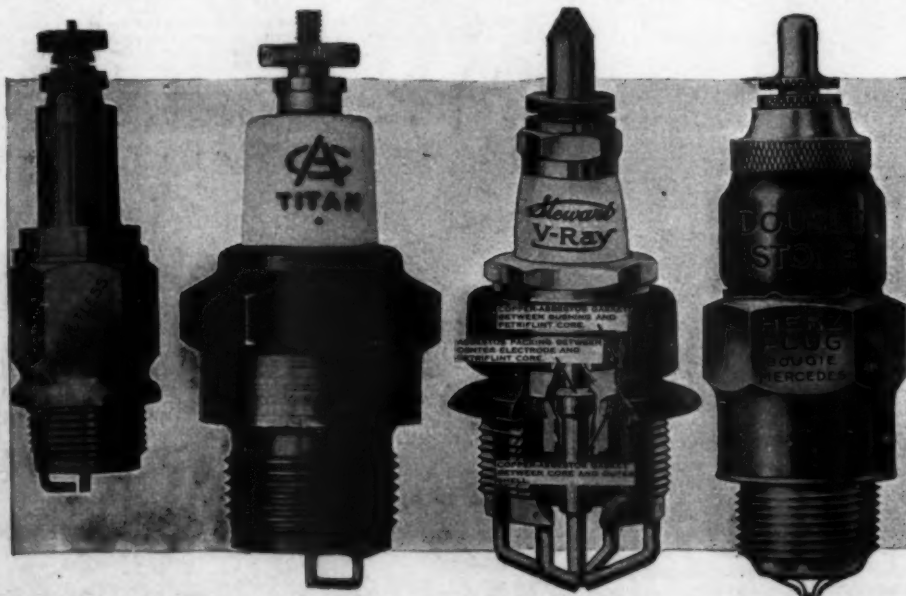
The Perpetual Spark Plug Co., Inc., of Dunmore, Pa., markets a plug which differs from the conventional type in many important respects. Chief among these is the absence of the bushing nut for holding the porcelain in place, and it is said that the elimination of this gland does away with any possibility of the porcelain's breaking. The inside diameter of the shell tapers in at the top, making a shoulder against which the porcelain, similarly tapered, abuts. Between these two members is placed a metal gasket. This point in the original assembly of the plug having been reached, a chemical compound is poured between the insulator and the shell, filling a recess provided for the purpose. The compound is then heat-treated and submitted to a chemical action which converts it into sandstone. Thus in the completed plug the insulator is held in position against the metal gasket by a projecting ring of chemical sandstone, without pressure on the insulator itself. In this way the shell is left to expand without putting pressure on the insulator. The claim is advanced for the Ezekleen plug that it is oil- and heat-proof, and can be thoroughly cleaned without disassembling.

Kingston Mica

The Kokomo Electric Co., of Kokomo, Ind., includes in its complete line of ignition specialties the Kingston mica spark plug. This plug has never been extensively exploited, but a large number of high class engine builders are specifying it as regular equipment for their motors. It is made in 1/4-inch, 3/8-inch, 1/2-inch and metric thread sizes, and is fully guaranteed by the maker. All sizes except the 1/4-inch are listed at 75 cents each.

Eklips

This plug, which is manufactured by the Fulton Mfg. Co., of Milwaukee, Wis., is considered one of the leading multi-point plugs on the market, and its sales are declared to have increased annually since its introduction two years ago. The Eklips is described as a high grade plug which is made for the discriminating engine owner who requires service. Every part is constructed of the best quality of materials, and the porcelains are built heavily and are so placed in the shell that no part of them touches the steel. Ample provision has been made for extension and contraction of the metal parts and porcelain, and the cylinder end of the plug is so constructed that it is practically foul-proof. It is declared that the multi-point feature of the Eklips facilitates starting, makes the engine run more smoothly and lends durability to the plug itself.



Oakes & Dow Soot-less

The A C Titan

Stewart V-Ray in section

Herz Double-Stone

Benton

The Benton case-hardened spark plug, which is manufactured by the L. F. Benton Co., of Vergennes, Vt., has a number of features which commend it to the motor boatman. They combine to make a plug, it is said, which is easily cleaned without danger of breakage and which assures high motor efficiency. The insulator in the Benton is composed of thin sheet mica, spirally wound around the central electrode, forced under high pressure into the corresponding bore of the case-hardened steel bushing, and turned and scraped to a smooth outside finish. The porcelain acts only as a spacer and cover to keep dirt and moisture off the mica. Even if cracked or wholly removed the action of the plug would not be impaired. The small internal gas space at the end of the plug is designed to minimize heat generation and carbon formation, and the sparking points extend well out into the combustion chamber in order to give a good spark, sure ignition and quick cooling. The electrode terminals are of a special composition that, it is said, will not melt or corrode.

Rival and Wizzard

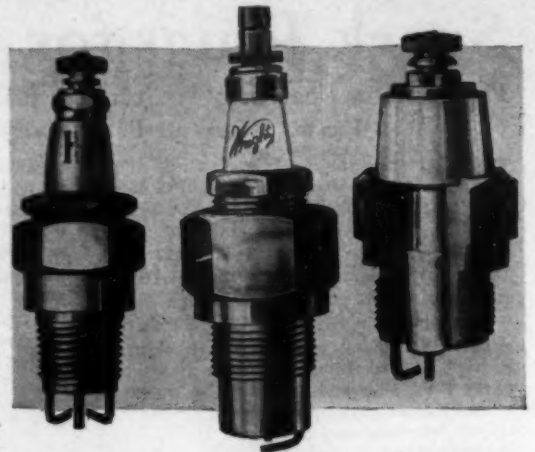
The Hampshire Mfg. Co., of Hatfield, Mass., manufactures several spark plugs, including the Wizzard, the Rival, and the Rival. The manufacturers guarantee that only the very best grade of materials is used in these plugs, and particularly emphasize that the sparking points are made from high grade nickel alloy, which has a very high melting point and will withstand excessive heat without disintegration. The Rival plug shown in the illustration on page 33 is sold for 75 cents, the Wizzard retails for \$1, and the Wizzard priming for \$1.25.

Center Fire

The Milwaukee Auto Specialty Co., of Milwaukee, Wis., is manufacturing the Center Fire, which operates on a new principle for the purpose of increasing the power of the motor and eliminating short circuits. The principal feature of the plug is the extension of the firing points down into the combustion space of the cylinder. This is done in order to bring the firing point down into the middle of the incoming explosive mixture, allowing the combustion to travel in all directions at the same time, and also to prevent the formation of carbon on the porcelain or shell of the plug. The Center Fire is furnished with porcelain-lined body and is guaranteed by the maker to be constructed of the best materials, with imported porcelain and meter wire firing points. It is made in standard sizes and with the firing points extending from 1/2 inch to 3 inches beyond the shell. The price range for the porcelain-lined plug is \$1.25 to \$2, according to the length of the firing points, and \$1 to \$1.75 for the plain plug.

Sharp Kopper King

As part of an unusually complete line of plugs, the Sharp Spark Plug Co., of Cleveland, O., offers the Kopper King, which is declared to represent the most advanced ideas in spark plug design and construction on the market to-day. It has been on the market for more than a year and a half, and was among the first in whose design was incorporated a copper-covered surface for the metal part. This copper protection of the



Hercules Giant

N. Y. Mica & Wright

Peco for heavy service

shell is declared to prevent rust and to eliminate short-circuiting which might otherwise be caused by the formation of carbon or soot on the inside of the shell. Other features are the elbow shape of the firing points, which keeps the gaps free from oil; the meter wire center electrode, which has a one-piece monel metal stem, and the copper-covered asbestos gaskets which lengthen the life of the porcelain insulation and protect it from excessive vibration. The Kopper King is made in all threads and sizes for every type of motor, and is sold for \$1, with a guarantee that it will give absolute satisfaction.

Viking

The John MacGregor Co., Inc., of Boston, Mass., manufactures a full line of Viking spark plugs for every type of engine service. The Viking is of large, massive construction and is provided with a large center electrode which is made out of one piece of pure nickel from end to end. This electrode is fused into the porcelain, thus preventing all possible loss of compression. The steel shell in all Viking models, after being inspected and tested, is carefully polished and is then immersed in an electrolytic bath for the purpose of having deposited thereon a heavy shell of copper. The heavily coppered bushing is then oxidized and sprayed with a baking lacquer. This process results, it is said, in turning out a shell which has all the strength of steel, is provided with a beautiful finish, and is protected against any possibility of rusting. One of the Viking models which is adapted particularly to heavy-duty work is equipped with a core made from pure India ruby mica, and is larger and more substantial than the mica cores generally to be found.

Peco Valve

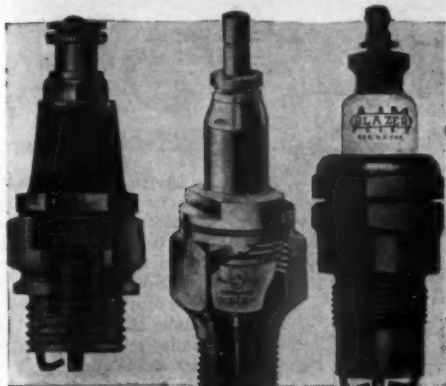
The Peco Valve plug, manufactured by the Power & Efficiency Co., of Trenton, N. J., presents a new and novel method of construction. It has a compound insulation, the outer one covering the inner core and the latter being placed in the socket from the bottom, so that the pressure in the motor seals it automatically without any undue strain being placed on the insulation. Thus there is no necessity for the use of a gland to hold the core in place. The insulations are composed of adamant stone, which is claimed to withstand excessive heat without breakage. It is further stated that, should the outer insulation become affected through the splashing of water, the plug will continue its work properly, as the main insulation will be unaffected. The Peco plug is made in all sizes and is sold at \$1.

Stewart V-Ray

The Stewart V-Ray spark plug is one of the products of the Stewart-Warner Speedometer Corp., of Chicago, Ill. It is made with a universal terminal cap which fits practically every type of cable terminal in use, and also embodies a device for cleaning the sparking points. The core is of a non-absorbent substance known as Petrifint, which is declared to be as nearly fracture-proof as science can make it. Asbestos packing is provided between this Petrifint core and the center electrode, and there are copper asbestos gaskets between the outer shell and the core and between the core and the bushing. These gaskets, with the asbestos packing, make the plug gas-proof. The four sparking points of the Stewart V-Ray comprise one of its foremost features. These points are of the finest quality heat-resisting nickel steel wire, and are declared to insure a steady, unfailing and intense spark.

Hercules

The Eclipse Mfg. Co., of Indianapolis, Ind., makes a specialty of Hercules spark plugs, which are manufactured under a very strong guarantee and are declared suitable to the requirements of any type of motor where the service is unusually exacting. The plugs are made in two types, the Hercules Giant having a 1 1/4-inch hex shell and the Hercules, Jr., carrying a 1 1/8-inch shell. Of these, the former is perhaps the best suited for the average make of marine motor. It is of heavy construction throughout and is provided with double sparking points. The Eclipse company builds porcelain plugs for the most part, but is also in a position to furnish mica cores.



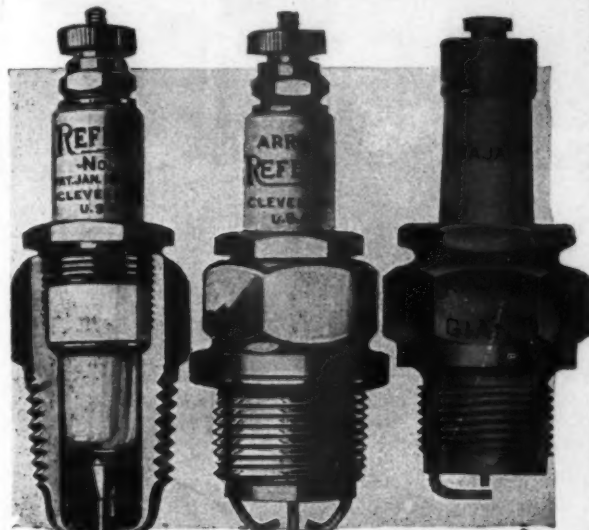
Auburn
(AIM) Mica

Red Head
Combination

AIM Blazer

Herz

The Herz plug—the famous Bougie Mercedes of Europe—is not allowed by its manufacturers to rest on its past laurels, but is constantly being improved upon. Herz & Co., of New York City, besides effecting many recent improvements in its design and construction, have also increased the number of models, to



Reflex No. 1

Reflex Arrow

Rajah Giant

provide exactly the type of plug which is best suited to each individual motor. The most noticeable change in construction is the split terminal, which has replaced the screw cap of former models, and there are other slight structural changes which tend toward the complete perfection of this plug. Among the chief features of the Herz are the unbreakable double stone insulation, the center electrode of platinum alloy, and the four-point outer electrode which has a cavity behind it. The shooting effect of this cavity is declared to obviate the formation of carbon and to make sure the explosion of any mixture, however lean.

A C Titan

The A C Titan plug, manufactured by the Champion Ignition Co., of Flint, Mich., is used very extensively for marine motors, and is declared to be popular with the makers of high-efficiency engines, for the reason that it does not leak compression under extreme conditions, and also because its assembly is such that the expansion of the component parts is properly taken care of. One of the features of the A C Titan is that the center electrode is screwed into the porcelain, thus applying pressure on the copper asbestos gasket and preventing the possibility of leakage. After being screwed down the electrode is secured with cement. The porcelain is of unusually heavy construction and is declared to be proof against breakage, by reason of a new process in the assembly which evenly distributes the pressure against the shell. The single electrode used is of a special shape which prevents the spark gap from changing under heat.

A I M Blazer

The Auburn Ignition Mfg. Co., of Auburn, N. Y., manufactures several plugs for different types of service. One of these is the Auburn porcelain and another the Auburn mica. The latter is constructed with India ruby mica insulation, and the core is built up of mica discs compressed over a wrapped mica tapering tube. The aristocrat of this line is the A I M Blazer, which is of unusual size and strength. It is constructed with an outside bushing which permits the use of an extra large core of a heat-resisting material known as Fireite. The claim is made that this plug will stand any amount of rough usage. It is made in the 1/2-inch standard, the 3/4-inch S. A. E. and the 7/8-inch extension sizes, and sells for \$1.

Champion Reliance

Of all the plugs manufactured by the Champion Spark Plug Co., of Toledo, O., this is the one most suited to the marine service, as it is so designed that it

cannot be short-circuited by water. Features of its construction follow: The insulated sparking point is a hairlike platinum wire entirely protected from corrosive action by being baked in and brought flush with the surface of the porcelain insulator. It is stated that the spark in leaving the minute point is concentrated and intensified in such a degree that its heat and scouring action, being directed against the surface of the insulator, instantly destroy any short-circuiting matter surrounding the plug. This action is purely electrical, no moving parts or valve actions being employed, and it is said that the plug requires no cleaning or attention. The cylinder end presents a solid surface of porcelain, thereby preventing a possibility of leakage past the central electrode. Cements, nuts, gaskets and like devices are entirely eliminated.

L-A

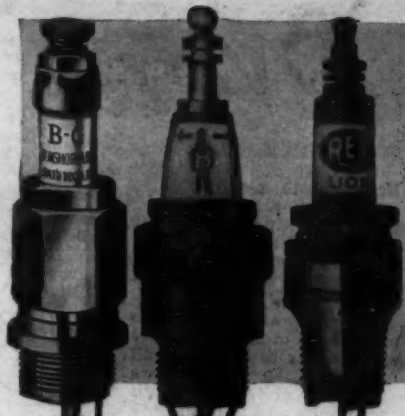
The Lockwood-Ash Motor Co., of Jackson, Mich., turns out a complete line of spark plugs, which retail at 75 cents each, and also the L-A Giant, which is priced at \$1. The standard sizes are notable for the exceptionally large shells and rugged porcelain insulators. The electrodes are made of a special composition which is capable of withstanding any heat to which they will be subjected in service, and the ground electrode has a special shape which allows any accumulation of oil to run off at the heel and thus prevent short-circuiting. All joints are made compression-tight by means of copper asbestos washers, and the porcelain insulators are interchangeable and are easily removable if broken by accident. The L-A Giant is a stone insulator plug of massive construction which is put out especially for heavy-duty service. The shell is of 1 1/4-inch hexagonal stock, and the insulating core, of extra size, is stated to be practically indestructible. The copper-lined steel bushings are declared to be of sufficient strength to compress the copper asbestos packing gaskets to a condition of absolute gas-tightness.

Bosch

The Bosch spark plug, which is manufactured by the Bosch Magneto Co., of New York City, consists of but three principal parts: A heavy central electrode, a single insulator and a steel shell—all made up as one piece. This construction eliminates the threaded joints found in other plugs, and is stated to provide great strength and to absolutely prevent leakage of compression or power. The insulator of the Bosch plug is of stellite, an almost unbreakable stone which, it is said, is neither brittle nor subject to deterioration by intense heat, extreme pressure or an over-supply of oil. The three electrodes are of nickel alloy and are heavy enough to withstand the most intense magneto spark, and rigid enough to prevent variation of the spark gap under compression, thus assuring long life and minimum adjustment. The knife edges of the electrodes are designed especially to present the least possible resistance to the current, so that a spark is obtained at very low engine speeds. The recess in the stellite insulator around the lower end of the central electrode provides two insulating air spaces, which are said to decrease to a minimum the possibility of the plug circuiting through fouling or over-oiling. The Bosch water-proof hood for plugs of this make is a valuable accessory manufactured by the Bosch company which is particularly adapted to marine service.

Reflex

The Reflex Ignition Co., of Cleveland, O., especially recommends its Reflex No. 1 spark plug for marine service. This plug is of strong, simple construction and is declared to be absolutely compression-tight.



Batchelder-Gallant B-G

Red Head Big Boy

Rex Lion

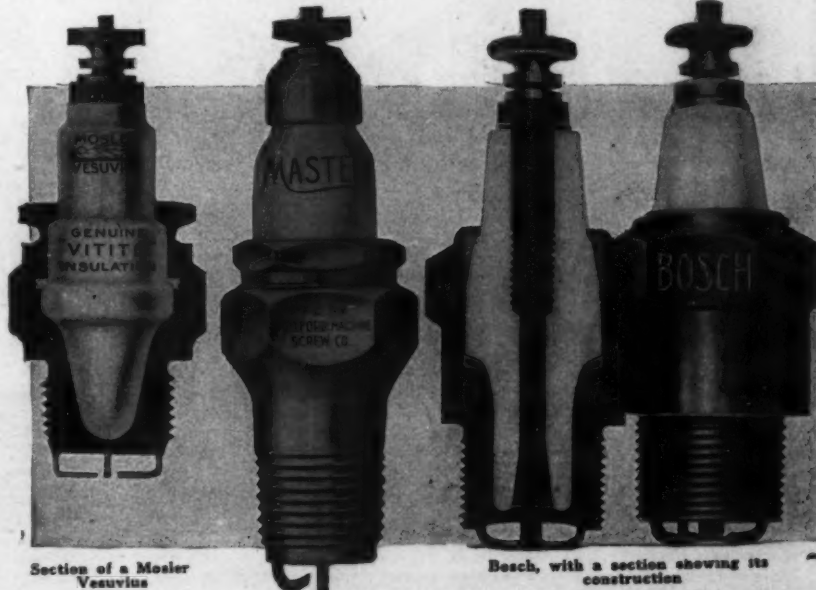
One of the features of its design is a patented concave baffle on the center electrode which is intended to deflect all soot and dirt away from the enclosed combustion chamber and out through the circular spark gap. The arrangement of this baffle may be seen from the accompanying cut-away illustration. The shell of the No. 1 is nickel-plated and a heat-proof porcelain is used. This plug is made in the standard sizes and is sold for \$1, extra cores costing 40 cents each. The Giant Reflex which is designed for heavy-duty service, has a large deep combustion chamber which permits of greatly increased and strengthened core insulation. The Giant is of powerful proportions and construction and its heavy electrode is fully protected by its enclosed design.

The Red Head Family

The Emil Grossman Mfg. Corp., of Brooklyn, N. Y., offers four spark plugs which are especially suited for marine service. These are the Red Head Standard, Red Head Big Boy, the Red Head Priming, and the Red Head Combination plugs. The first of these is suitable for the majority of motors, but where conditions are unusually severe, the manufacturers recommend the use of the Big Boy or the Combination plug. The priming plug is, of course, particularly adapted to cold weather use on motors which have no petcocks. The first three of the plugs mentioned are constructed with Vitristone, a new artificial stone insulator which, it is stated, will stand 1,600 more degrees of heat than porcelain and is absolutely unaffected by the temperature prevailing in the modern high-speed high-compression motor. It is also claimed that it is ten times stronger than porcelain and will not, therefore, crack when accidentally struck by a wrench. As it is practically non-porous, it is proof against short-circuits. The Vitristone insulator in the Big Boy plug is twice as large as in the Standard, and the center electrode and three heavy firing points are made from a special manganese alloy which has great heat resistance.

Master Calorite

The Hartford Machine Screw Co., of Hartford, Conn., is announcing a marked improvement in the 1917 models of its Master Calorite spark plugs. The already heavy Calorite insulator has been greatly increased in size, in order to give greater strength to resist side blows such as a plug is liable to receive from the slipping of a wrench. One of the particular features of the material Calorite which is used in Master plugs, is that it will withstand enormous strain due to sudden temperature changes. So pronounced is this temperature-resisting attribute that in the manufacturer's tests Calorite insulators are raised to white heat by means of a gasoline blow torch and are then plunged instantly into cold water. The test is, of course, far more abusive than any spark plug would receive in actual service, but it shows unusual strength of the insulator and, it is stated, can be repeated. (Continued on page 55)



Section of a Master Vitrite Insulator

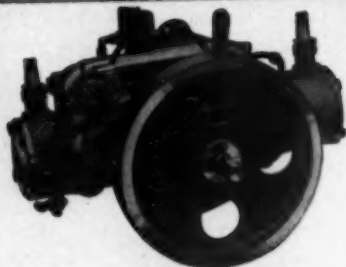
Master Calorite

Bosch, with a section showing its construction

New Things For Motor Boatmen

[Each month many new parts, attachments and fittings, interesting and invaluable to owners of large and small motor boats, are added to the devices already on the market. Announcements of these articles come to us in such numbers that in order to introduce all of them to our readers we have been obliged to omit descriptions and publish only illustrations with short explanatory captions. In doing this, however, we urgently

invite our readers to write us for complete information, as we shall take the greatest pleasure in providing it, together with the manufacturers' names and addresses. Do not hesitate to ask us, as we have made special arrangements to take care of this branch of our correspondence and are able to give you accurate information with the greatest promptness.—Editor.



A new covered cylinder 2 1/2 h.p. inboard engine for small boats, which is claimed to be practically vibrationless.



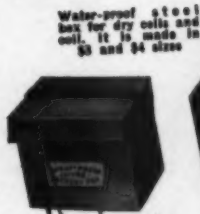
An important feature of Never-Leak tanks is that they are galvanized after being built up, thus giving an unbroken coating and doing away with residue on the inside.



The Lequeux carburetor, which has but one part, and is completely automatic at all speeds.



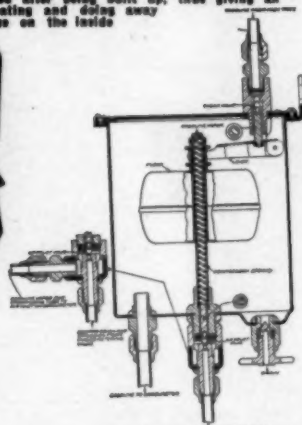
A patent chain steerer, which is positive in action.



Water-proof steel box for dry cells and coil, it is made in \$3 and \$4 sizes.



A new tilting wheel, which gives the helmsman freedom of movement in entering the steering position.



An auxiliary fuel feed tank, which supplies the carburetor by gravity and permits the main gasoline tank to be placed below the float level.



An efficient coil water heater, which is attached to the exhaust pipe of a marine engine.



A new fuel saver, which conducts superheated air from the exhaust manifold direct to the carburetor intake.

An auxiliary air valve, which is designed to give more power with a corresponding reduction in gasoline consumption.



Perfect Handle ballpeen hammer and Stilson wrench, which combine strength with comfortable grip.

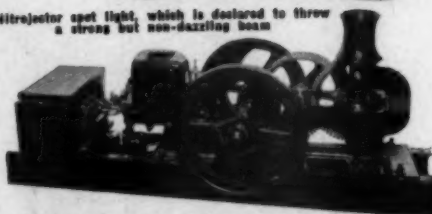


Guaranteed preparation for removing carbon from engine cylinders.

Aluminum alloy piston and connecting rod, the use of which is said to make a four-cylinder motor run like a six.



Nitrojector spot light, which is designed to throw a strong but non-dazzling beam.



Direct-connected gasoline engine anchor hoist for use on motor yachts.



Hi-Comp piston ring, which consists of two concentric interlocking rings and is sold in sizes up to 5 1/2 inches for \$1.50.



A removable base vise, declared to be extremely useful in general machine shop work.

We Make Important Announcements

How the Coming Issue of MoToR Boating Will Be of Great Interest to Every Reader—The Account of the Show and the Beginning of a Special Series to Appear in February

"My Ideal Cruiser"

MOTOR BOATING has always been a great believer in the amateur motor boatman. We have always considered that he in particular is the one who obtains the most real fun and enjoyment from boating. Furthermore, we believe that much of the development in types of boats, and indirectly in power plants, has been due to the amateur's ideas. No one knows better than the man who owns and navigates his craft what a boat should be and, above all, what it should not be. Allow such a man to give free expression to his ideas, and you will have something really worth while. In many respects his opinions will be worth more than those of the professional.

Probably the branch of motor boating which interests the greatest number of amateur motor boatmen is that of the small cruiser. Naturally, there are several types, all of which might be rated as equally good, but concerning which there is much honest difference of opinion. Therefore, it would be impossible to select any one design which would best suit the fancy of everyone.

Believing, as we do, that the design of an ideal cruiser would be of great interest, MoToR BOATING will publish in each of the next six or more issues a design of such a small cruiser, complete in every particular. The plans will include an outboard profile, as well as interior arrangement plans, construction plans, full set of lines, table of offsets, and numerous details—in fact, all data necessary to build the cruiser. The reasons why the design meets the designer's ideas of his ideal boat will be set forth.

The designs which we shall publish each month will be restricted to those by amateurs—designs by motor boatmen who know from actual experience what they are talking about.

If you measure up to these requirements, and have ideas on the subject, we should like to publish the plans of your ideal cruiser. In other words, we want the plans to come from MoToR Boating's own readers. The first of the series is to be published next month, and will be typical of the kind we desire.

For each design we publish, we shall pay \$50. In addition to this, we shall allow MoToR Boating's subscribers to decide which one of the designs comes nearest to their ideal cruiser. The designer of the boat which receives the highest number of votes after publication of the last design will be presented with \$100 worth of equipment of his own selection for his boat. Designs may be submitted any time up to May 1, 1917. Descriptions should not exceed 2,500 words in length.

As construction methods are more or less alike, irrespective of design, we shall not touch on this phase of the subject in the designs of the ideal cruiser. However, to show our desire to help amateur builders in every possible way, we shall publish, beginning with the March issue of MoToR BOATING, the most comprehensive and complete "How to Build"

article which has ever appeared in print. It will take five consecutive issues of MoToR BOATING to complete the series. It, also, will be by an amateur, who with his shipmate is now building an up-to-date cruiser. He will describe his methods in detail from the getting out of the plans for his boat, and the laying of her keel, up to the trial trip. Being an amateur builder, he will describe his methods in a way that you can understand. Furthermore, his methods will be applicable to any of the designs in the ideal cruiser series. In this way it will be possible for anyone to build that particular boat which best suits his fancy.

The February Issue of MoToR Boating

THE next issue of MoToR BOATING will be the big annual show number. Most of our readers are familiar with our method of presenting the news of this, the only motor boat show of the year. Those who annually attend the show have become accustomed to using MoToR BOATING as their guide to the show and the various exhibits. Those who are so situated that it is impossible for them to attend in person always follow the show through the columns of MoToR BOATING. This year our show number will be bigger and better than ever before. Not only will it contain a description of all of the exhibits just as they appear at Grand Central Palace, but the issue will contain many articles of general interest as well. Of course, it will be profusely illustrated, and following MoToR BOATING's policy, its articles will appear in MoToR BOATING exclusively.

Some of the more important articles will be one on the new motors of 1917, and an article by Admiral Peary, the discoverer of the North

and the theme which he has chosen is bound to be of particular interest to motor boatmen.

For the small-boat man, and the practical man, our articles on electric wiring in a boat, and points dealing with the quiet operation of his motor, will be especially appealing. The cruise article which will appear in this number will not fail to interest everyone interested in boating.

As the supply of each issue of MoToR BOATING generally becomes exhausted a few days after the date of publication, it is very essential that motor boatmen should order their copies in advance, or, better still, be subscribers. No extra copies of the issues containing the Ideal Cruiser series will be printed, so that it will be impossible to obtain back numbers.

At the Show

EVEN at this writing there are countless indications that the annual motor boat show for 1917 will be the most successful that has ever been staged. Interest in the sport of motor boating, stimulated by the many steps which have been taken for putting motor-equipped craft in the forefront of our country's defenses, has never been at a keener pitch, and the present high standards of marine engine efficiency are attracting more and more people who have never before tasted the spray of seawater on their lips.

Numerous old exhibitors are materially increasing their space at this show, and MoToR BOATING itself is taking a booth which is four times as large as any it has previously occupied. To this space we most cordially invite all our subscribers and friends in the trade. At all hours while the show is open there will be someone on hand to welcome you, and we sincerely hope that you will make the MoToR BOATING booth your headquarters and rallying place. The space will be attractively arranged, and decorated with original cover designs for the February and other issues. If it so happens that you who read this are not a present subscriber for MoToR BOATING, you will find no one at our booth who will try to keep you from signing up on the spot, but whether or not you are a subscriber, you will be welcome there if only you are interested in motor boats and boating. If you happen to be a builder, architect, engine or accessory manufacturer, you will find others there of your calling with whom to talk over the prospects for the coming season.

One of the most interest-compelling and unique features of the whole show will be found right at the MoToR BOATING exhibit. It will be a complete copy of the present issue, enlarged to many times its ordinary size. Each page will be thrown up by bromide enlargement to 30 x 40 inches and will be mounted on cardboard and bound in book fashion. Best of all, a young woman of pleasing voice and charming feature will turn the pages and point out to all comers the beauties and excellence of the magazine.

You will probably regret it for the remaining days of your life if you fail to visit the MoToR BOATING booth.

— "MY IDEAL CRUISER" —



Full plans and working drawings of this cruiser reproduced to scale will be published in the February issue of MoToR Boating. See note above

Pole, touching on flying boats and flying. The third instalment of the lubrication series which is appearing in MoToR BOATING will appear in the February issue. The new boats of the year will be given particular attention in the show number of MoToR BOATING. We shall have illustrations, plans, and descriptions of many, ranging in size from the smallest up to and including a large express cruiser.

Herbert Kaufman, a newcomer in the ranks of motor boatmen, although well and favorably known by everyone as one of the country's foremost writers, has promised to contribute one of the leading articles in our show number. This writer needs no introduction,

Yard and Shop

An Attractive Outboard Motor Boat

Hurt T. Stanton, Chicago representative of the Koban Motor Mfg. Co., of Milwaukee, Wis., has sent us the accompanying illustration of a Koban detachable rowboat motor installed on an unusually attractive boat. The craft was built by the Thompson Bros. Boat Mfg. Co., of Peshtigo, Wis., and has flaring sides forward and a generally seaworthy appearance, which is in marked contrast to the type of boat which was available a few years ago for the outboard motor. In a



A pleasing outboard motor outfit owned on Diamond Lake, Mich. The Koban motor, which is installed, gave a speed of more than 11 miles an hour in a hotly contested race against twenty-four other starters.

race last summer on Diamond Lake, Mich., over a course which had been accurately surveyed on ice the winter before and buoyed from shore marks, this outfit made 5 1/2 miles in 29 minutes, 30 seconds. The boat started from scratch with limit boats of 20 minutes' handicap and finished first in a field of about twenty-five starters and about 12 minutes ahead of the other scratch boat, which was equipped with another make of twin-cylinder motor.

Submarine Chasers on Their Native Heath

The illustration in the upper right-hand corner of this page was obtained from Italy with considerable difficulty by the Sterling Engine Co., of Buffalo, N. Y. It shows nearly a dozen of the submarine chasers which are now being used by the Italians to defend their coasts and shipping from the under-water monsters of modern warfare. They are 58 feet in length by a beam of 9 feet and a draft of 30 inches, and each is powered with a pair of eight-cylinder 150-200 h.p. Model F Sterling motors, which give a speed in excess of 30 m.p.h. They are built of three skins with separating layers of canvas, and the armament in part consists of a three-pound anti-aircraft gun which is mounted on the forward deck. A little aft of amidships there are two machine-guns protected by a metal shield. The Sterling Model F's have been very successfully used by the Italian and other governments in work of this kind, and their success is all the more remarkable when it is known that the majority of the engineers are recruited from the ordinary walks of life and have not had previous experience with marine engines.

Wagner-Hoyt Starting and Lighting System

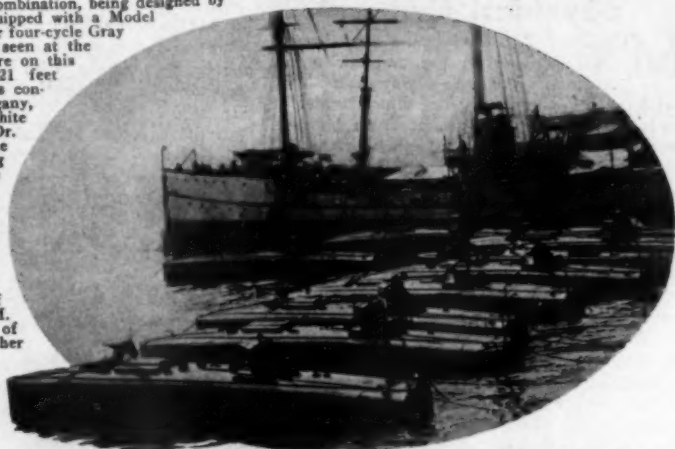
The illustration in the center of this page shows an ideal installation of a starting and lighting system on a heavy-duty Frisbie engine. The generator used in the installation is a 12-volt 6-ampere unit, built to run at engine speed, and is called by the manufacturer of the system, the Wagner-Hoyt Electric Co., of New York City, the type LN 125. It is geared directly to the timing gears. The starting motor is a 35-foot-pound torque unit operated in connection with the flywheel and using the outboard type of Bendix drive. It has proved itself powerful enough in this particular installation to turn the engine over at 195 r.p.m. against full compression. A 12-volt 60-ampere-hour storage battery is used, mounted in a box to the left of the engine. The switchboard is complete and the lighting circuit consists of about fifteen lights and furnishes current also for operating the 12-volt Klaxon horn.

This company puts out both 6- and 12-volt systems. The output of the generator on the former type is 10 amperes and on the latter 6 amperes. Irrespective of the capacity of the generators and the torque of the motors, the Wagner-Hoyt company builds a universal size of 5-inch-diameter machines, thus permitting the use of one type of saddle for mounting. In connection with all systems the famous Ward Leonard type of control is used. All machines are built with the idea of making them water-proof.

Excellent Combination

Detroiters root pretty hard for home talent, and they have a good deal of this commodity to root for. It is not surprising, therefore, that one of the most attractive runabouts in Detroit waters was designed, built and powered in that city.

She is a Hacker-Gray combination, being designed by John L. Hacker and equipped with a Model D 20-24 h.p. four-cylinder four-cycle Gray motor, and she may be seen at the left of the bottom picture on this page. The length is 21 feet over all, and the boat is constructed, not of mahogany, but of clear hard white pine, finished bright. Dr. W. E. Sanborn is the owner. The boat flying the Detroit Yacht Club pennant is another Hacker-Gray combination, the motor being the same, but the boat length 3 feet greater. She is a V-bottom built from Mr. Hacker's designs by the American Boat Co., of Detroit, and owned by M. J. M. Studebaker, Jr., of South Bend, Ind. At her wheel is Harry Link, Gray Service manager, and beside him sits Emmett Gray, of the Gray-Hawley Co., of Detroit.



A fleet of Sterling-powered patrol boats used by the Italian Government to defend its coast and shipping from hostile submarines. There are two Sterlings in each.

Grossman Undergoes Reorganization

The Emil Grossman Mfg. Co., Inc., of Brooklyn,

N. Y., was recently reorganized under the name of Emil Grossman Mfg. Corp., incorporated under the laws of the State of New York. The capital stock was divided into \$150,000 of first preferred and \$160,000 of second preferred with 10,000 shares of common stock having no par value. The entire capital has been paid in. The officers of the new company are as follows: Emil Grossman, president and general manager; L. M. Schwartz, vice-president; Harmon August, treasurer, and C. L. Hemphill, assistant treasurer and secretary. The reorganization of this company has been effected as part of the management's plans for the enlargement of the business.

Evinrude Canadian Sales Handled Direct

It was recently announced by Osmon A. Dole, sales manager of the Evinrude Motor Co., of Milwaukee, Wis., that this concern is now handling all Canadian sales direct, instead of through its former connection, Melchior, Armstrong & Dessau, of New York City. The same sales policies which have proved so successful in the United States will be continued in the Evinrude company's relations with Canadian dealers, and a very fine 1917 season is expected, even under present conditions.

Toppan Co. Has Show of Its Own

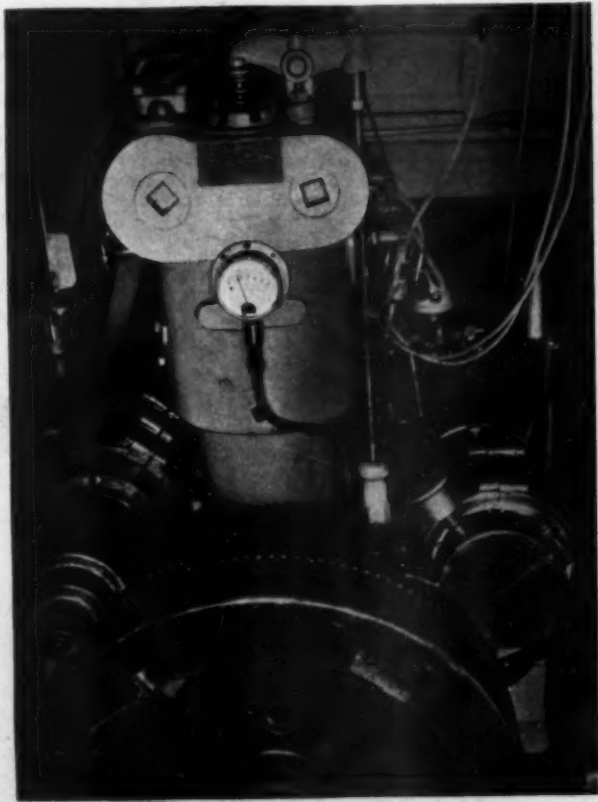
The Toppan Boat Co., of Boston and Medford, Mass., which recently removed to its headquarters at 81 North Washington Street, Boston, has a most interesting motor boat show of its own—one which is attracting many visitors who are looking around for a boat for next spring. The Toppan company is showing its 1917 samples, and among these is one that is almost sure to attract attention wherever it goes, as it is a fine-looking rig, admirably arranged for the average boat user. It is a 20-foot lap-streaked dory, equipped with a 6 h.p. two-cylinder engine, installed under the after part of the cockpit. It is a seaworthy craft and also a fairly speedy one, and it is capable of carrying ten or twelve persons comfortably. The famous Toppan 16-foot Sportsman, equipped with a 3 h.p. engine, is also on display, as well as the 16-foot sailing dory and the 21-foot V-bottom runabout, which is equipped with a 12 h.p. Universal, giving a speed of around 13 m.p.h. Outboard motor rowboats and a representative line of detachable and marine type motors, together with hardware of all kinds, round out the completeness of this private exhibition.

Removal Notice

The American Screw Propeller Co., of 1520 Sansom St., Philadelphia, Pa., designers of screw propellers by the Dyson method, have asked us to announce the removal of their offices to 505 Hale Bldg., Juniper and Chestnut Sts., Philadelphia, Pa. We are informed that this change was made necessary by the constantly increasing demand for Dyson propeller designs.

Boat Building in Norway

Although the boat builders of neutral European countries are devoting a share of their energies to the construction of boats for war purposes, this work is not being carried on entirely to the exclusion of pleasure craft. The Sterling Engine Co., of Buffalo, N. Y., informs us that it has re-



A satisfactory self-starter installation on a heavy-duty marine engine. The starting system is the Wagner-Hoyt, in which the generator is driven off the timing gears, and the motor is connected by Bendix drive to the flywheel.



Two Hacker-Gray runabouts from Detroit. Both are powered with the Model D four-cylinder Gray, but the one on the left, being slightly smaller (21 feet as against 24), has a shade better speed—29 miles an hour, instead of 18 1/2.



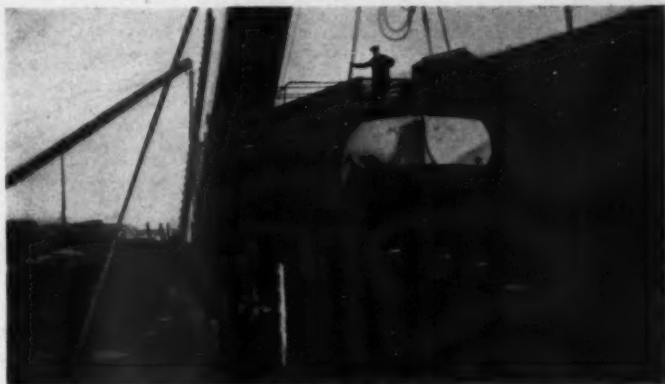
R. B. Burnham, marine sales manager of the Gray Motor Co., at work in his office. The young woman behind him is holding a map on which inquiries and sales are recorded.

ceived many orders for motors to be used in private yachts and runabouts, and that its business has actually been greater in this field than in times of peace. The illustration at the bottom of this page, however, shows a group of 65-foot patrol boats which are now being built in Norway to be equipped with three 200 h.p. Model F. Sterling motors each to attain a speed of approximately 21 knots. Whether Sterling motors are used for pleasure or for naval purposes, the company's agents on the ground report that they are giving universal satisfaction.

Johnson's Carbon Remover

S. C. Johnson & Son, of Racine, Wis., are offering Johnson's guaranteed carbon remover, which is declared to be the most effective means of eliminating carbon troubles that has yet been discovered. According to the Johnson company, 80 per cent. of engine trouble is directly traceable to the presence of

disappear in the course of two or three hours' running. This preparation is guaranteed to have no cor-



Commodore Chas. W. Ketcher, owner of the express cruiser Betty M III, is now navigating the Mississippi River en route to the big mid-winter regatta at Miami. Here we have an unusual view of his craft being loaded on to the cars for shipment to Jessa, Ill., a small town on the Ohio River, whence the start was made.

rosive action on any metal, and the makers state that it for days without any injury resulting. In most cases the carbon deposits will yield to one application of the remover, but in aggravated cases the company advises that two doses of one ounce per cylinder be applied at different times.

The Van Blerck Boat Book

We think we may say without exaggeration that no marine engine manufacturer has ever issued a more delightful publication than "The Boat Book" recently announced by the Van Blerck Motor Co., of Monroe, Mich. This book is not a catalogue and is not intended to take the place of one, but is merely a special compilation of a few of the most successful Van



Suarez I, a 191-foot auxiliary, owned in Vigo, Spain, and equipped with a 200 h.p. Wolverine oil engine. The vessel has a carrying capacity of 1,500 tons and is engaged in profitable commercial pursuits.



Boat building in Norway has been accelerated rather than retarded by the war, and pleasure craft of all descriptions are being built. Boats for war purposes are also being constructed and here we have a quartet of fast 65-footers for the Russian Government. They are powered with three Model F Sterlings each.

carbon in the cylinder heads and on the pistons. The commoner faults are knocking, loss of power and preignition. These may be overcome only by the removal of the carbon, but by scraping methods this is rather a troublesome proceeding. By the Johnson method, an ounce of the remover is poured into each cylinder through the spark plug or petcock opening and the motor allowed to stand over night. Upon starting up in the morning, it is declared, the bulk of the carbon will be almost immediately blown out, while the remainder will

Lest You Forget!

The Time—January 27-February 3
The Place—Grand Central Palace
The Event—Annual Motor Boat Show



King Alfonso, of Spain, set the fashion in motor boating, and the Spanish noblemen and hidalgos have not been slow in following suit. Almorana is a 32-foot cruiser owned by the Duke de Medinaceli, of Madrid, and powered with a six-cylinder Series B Sterlings.

Blerck-powered boats of the season. More than fifty boats are illustrated, some with profile views alone, and some with interiors and arrangement plans as well. The book is printed on heavy paper, and it is apparent to the most casual observer that no expense has been spared in preparing the half-tone illustrations, which are laid out tastefully on the page, singly.

(Continued on page 38)

Personalities

John G. Robinson

One of the best known Canadian motor boat and marine engine salesmen, a man who is also widely acquainted in the United States, through his connection with the Canadian Beaver Co., of



Walter H. Moreton

Toronto, has recently joined John L. Hacker, in the Hacker Boat Co., of Detroit, Mich., in the capacity of sales manager. John G. Robinson is in every way well equipped to make a success of his new position. He has had a lot of valuable experience in the construction of better class motor boats, and was the first builder in Canada who recognized the excellencies of V-bottom craft of the wave-collecting type. During the last two years with the Canadian Beaver Co., Mr. Robinson produced such well-known boats as Leopard, Speeder II, Kiota III and Helden II. Kiota III was hailed last year as the fastest displacement runabout in Canadian waters.

Walter H. Moreton

The Massachusetts interests of the Gray Motor Co., of Detroit, Mich., have for some time been placed in the able hands of a man who knows marine motors from the inside out and back again. This is Walter H. Moreton, of 214 State St., Boston, Mass., who has a thoroughly modern and up-to-date showroom where Gray motors in all sizes and types are exhibited. Mr. Moreton's headquarters are very conveniently located half a block from Boston Harbor and directly opposite the Custom House, and he will usually be found on hand during office hours and frequently before and after them, ready to talk business. The season of 1917 looks particularly bright to this energetic Gray distributor, and he reports an unusually large number of advance orders. He has built up an enviable reputation for himself both in volume of sales and in the high regard in which his customers hold him. Mr. Moreton will be glad to discuss marine engines with anyone who will call at his showroom and to show the superior details in the design and construction of the 1917 Gray motors.

John G. Robinson

MOTOR BOATING ADVERTISING INDEX

A		H		P	
Aerial Age	102	Gray, Henry	64	Palmer Bros.	68
Aerotherm Engine Co.	82	Gray Motor Co.	114	Pan American Aeronautic Exposition.	4
Albany Boat Corp.	67	Gray & Prior Machine Co.	64	Paragon Gear Works.	103
Alden, John G.	55	Great Lakes Boat Bldg. Corp.	59	Peerless Marine Motor Co.	81
American Manganese Bronze Co.	61	Gulf Refining Co.	111	Powerlight	56
American Screw Propeller Co.	55			Prest-O-Lite Co.	110
Anderson Engine Co.	55				
Arrow Motor & Machine Co.	55				
Athol Mfg. Co.	58				
Automatic Bilge Bailer Co.	55				
Automatic Machine Co., The.	88				
B		I		R	
Baldrige Gear Co.	92	Ingram Hatch Motor Corp.	58	Racine Boat Co. (Racine).	76
Boston Varnish Co.	102	International Silver Co.	56	Red Wing Motor Co.	85
Bowes & Mower	55, 92			Regal Gasoline Engine Co.	58
Bridgeport Motor Co.	55			Reid, A. H.	55
Brooks Mfg. Co.	84			Richardson Boat Co.	70
Bruns, Kimball & Co., Inc.	55, 94, 104			Roberts Motor Mfg. Co., The.	66
Buffalo Gasolene Motor Co.	1				
Buffalo Specialty Co.	5				
Burger Boat Co.	64				
Byrne, Kingston & Co.	104				
C					
Caille Perfection Motor Co.	116, 117				
Campbell Co., A. S.	105				
Cape Cod Power Dory Co.	72				
Carleton Co., The.	58				
Carlisle & Finch Co.	92				
Carlyle Johnson Machine Co., The.	2				
Carpenter & Co., Geo. B.	89				
Carson Motor Co.	66				
Champion Spark Plug Co.	109				
Chelsea Clock Co.	78				
Classified Advertisements.	53B, 54				
Columbian Brass Foundry.	65				
Cox & Stevens.	42, 53A, 55				
Crockett Co., The David.	84				
Curtiss Aeroplane Co., The.	55				
Curtiss Co., J. H.	98				
Cutting & Washington Co.	87				
D					
D. & H. Mfg. Co.	98				
Deed, Jr., W. J.	55				
Deering Boat Co.	60				
Defoe Boat & Motor Works.	100				
De Forest Radio Telephone & Telegraph Co.	96				
Detroit & Cleveland Navigation Co.	58				
Detroit Lubricator Co.	82				
Devoe, F. W. & C. T. Reynolds Co.	83				
Doman Co., H. C.	64				
Driggs Ordnance Corp.	73				
Dunphy Boat Mfg. Co.	70				
Du Pont Fabrikoid Co.	82				
Durkee & Co., Inc., C. D.	78				
E					
Egyptian Deities	63				
Elco Co.	2nd Cover				
Erd Motor Co.	75				
Ericsson Mfg. Co.	115				
Evinrude Motor Co.	55				
F					
Farley Co., Edw. P.	51				
Fay & Bowen Engine Co.	121				
Ferdinand & Co., L. W.	86				
Ferro Machine & Foundry Co.	113				
Ford Yacht Agency.	52				
Fort Hill Laboratory.	55				
Frisbie Motor Co., Inc.	118, 119				
G					
Gardner & Co., Wm.	46				
Gas Engine & Power Co., and Chas. L. Seabury Co., Consolidated	6				
General Elec. Co.	60				
Gene V. Boat Co.	108				
Georgian American	55, 74, 84				
Gielow & Orr.	45, 53				
Gies Gear Co.	56				
Gray-Hawley Mfg. Co.	56				
H					
H. & N. Carburetor Co.	96				
Hacker, John L.	72				
Hall Co., W. S.	80				
Hand, Jr., Wm. H.	55				
Harmon Co., Clifford B.	56				
Heinze Electric Co.	64				
Henricks Magneto & Elec. Co.	80				
Hyde Boat & Eng. Co.	56				
Hyde Windlass Co.	120				
I					
Ingram Hatch Motor Corp.	58				
International Silver Co.	56				
J					
Jacobson Machine Co.	60				
Jennings Co., H. H.	47				
Johns-Manville Co., H. W.	56				
Johnson & Son, S. C.	69				
Jones, Frank Bowne	48				
Jones S. M. Co., The.	112				
K					
Kahlenberg Bros. Co.	63				
Kennedy Machine Co.	66				
Kenyon Co., R. L.	56				
Kermath Mfg. Co.	122				
Keys Piston Ring Co.	56				
Koban Mfg. Co.	74				
Kroh Mfg. Co.	56				
L					
Lacy Marine Motor Co.	57				
Lawley, Geo., & Son, Corp.	97				
Leece-Neville Co., The.	64				
Liggett, A. G.	56				
Lipman Mfg. Co.	56				
Lobe Pump & Machine Co.	68				
Lockwood-Ash Motor Co.	88				
Loew-Victor Engine Co.	3				
Lord, Frederick K.	55				
Luders Marine Construction Co.	72				
Lunkenheimer Co., The.	64				
M					
McClellan, C. P.	58				
McFarlan & Spilker Mfg. Co.	64				
McQuay-Norris Mfg. Co.	93				
Manzel Bros. Co.	76				
Marine Compass Co.	56				
Marine Equipment & Supply Co.	66				
Mason Machine Works.	56				
Mathis Yacht Building Co.	95				
Matthews Co.	86				
Michigan Standard Gear Co.	74				
Michigan Wheel Co.	66				
Miller Gas & Vacuum Eng. Co.	90				
Mills, R. S.	80				
Missouri Engine Co.	66				
Morton Motor Co.	60				
Mullins Co., W. H.	56				
Murray & Tregurtha Co.	70				
N					
National Aas'n Boat & Engine Mfrs.	70				
National Marine Lamp Co.	66				
Naval Architects & Yacht Brokers.	55				
Nelson Blower & Furnace Co.	66				
New York Yacht, Launch & Engine Co.	101				
Niagara Motor Boat Co.	94				
Nock, Frederick S.	55				
Norma Co. of America, The.	76				
Northwestern Motor Co.	78				
O					
Oberdorfer Brass Co., M. L.	78				
P					
Palmer Bros.	68				
Pan American Aeronautic Exposition.	4				
Paragon Gear Works.	103				
Peerless Marine Motor Co.	81				
Powerlight	56				
Prest-O-Lite Co.	110				
R					
Racine Boat Co. (Racine).	76				
Red Wing Motor Co.	85				
Regal Gasoline Engine Co.	58				
Reid, A. H.	55				
Richardson Boat Co.	70				
Roberts Motor Mfg. Co., The.	66				
S					
S-R Mfg. Co.	60				
Sands & Sons Co., A. B.	106, 107				
Sanford, Harry W.	55				
Scripps Motor Co.	79				
Seaman, Stanley M.	43				
Shaw Propeller Co.	56				
Sherman, E. M.	56				
Smalley General Co.	56				
Smith & Co., Edward.	60				
Smith Serrell Co., Inc.	90				
Snow & Petrelli Mfg. Co.	91				
Solheim's Launch Works.	56				
Southern Yacht Agency.	50				
Standard Co., The.	71				
Standard Motor Construction Co.	2nd Cover				
Standard Oil Co.	60				
Standard Oil Engine Co.	60				
Stanley Co., The.	60				
Stearns-McKay Co.	74, 84				
Sterling Engine Co.	3rd Cover				
Stone Mfg. Co.	60				
Strong & Bickmann.	49				
Swasey, Raymond & Page.	55				
Syracuse Wrench Co.	68				
T					
Tama, Lemoine & Crane.	44				
Texas Co.	60				
Thermex Silencer Works.	56				
Thompson Bros. Boat Mfg. Co.	56				
Tiebout, W. & J.	80				
Toppan Boat Mfg. Co.	60				
Tracy Still Mfg. Co.	60				
Trimount Rotary Power Co.	53B				
U					
Universal Motor Boat Supply.	76				
Universal Motor Co.	77				
Universal Safety Mattress Co., Inc.	60				
Upson-Walton Co., The.	60				
V					
Valentine & Co.	41				
Valley Boat Co.	72				
Van Blerck Motor Co.	4th Cover				
Viper Co., Ltd.	108				
W					
Water Craft Co.	70				
Watkins Motor Co., The.	60				
Weston Electrical Inst. Co.	68				
Wicker-Kraft Co.	60				
Wilcox, Crittenden & Co., Inc.	68, 82				
Willis Co., E. J.	68				
Wilmarth & Morman Co.	60				
Winton Engine Works.	99				
Wireless Specialty Apparatus Co.	60				
Wisconsin Machinery Mfg. Co.	60				
Wisconsin Motor Mfg. Co.	68				
Wright Machine Co.	100				
Y					
Youngs, Wm. P., & Bros.	60				



Photo by Kellar & White, N. Y.

Sunbeam II Boat built by Gas Engine & Power Company and Charles L. Seabury & Co.

The Flag-ship of the Mosquito Fleet Is Valsparred

Last September a well organized squadron of motor boats was drilled in defensive tactics against hostile submarines.

Sunbeam II, the first division flag-boat and a trim military cruiser of 43 feet, built by Gas Engine & Power Company and Charles L. Seabury & Co. started with her bright work Valsparred and came through the hard week fresh as a daisy.

There's preparedness for you! The builder of Sunbeam II knew that conditions would be hard. He knew that this boat would be busy every day of the maneuvers; that she would be

wet with spray all the time. So he made sure that her bright work would look right and stay bright. He used Valspar! And this boat did more than any other to make the maneuvers a success.



No matter what you use your boat for, get the most out of it with the least trouble and expense. Begin with the bright work. Use Valspar, the only varnish

that won't turn white in water.

Valspar keeps boats spic and span without continual "touching up." Keep that in mind for next spring.

Other Valentine Marine Products

They excel in their particular lines as Valspar does among varnishes.

Valentine's Yacht White Valentine's Yacht Black Valspar Bronze Bottom Paint

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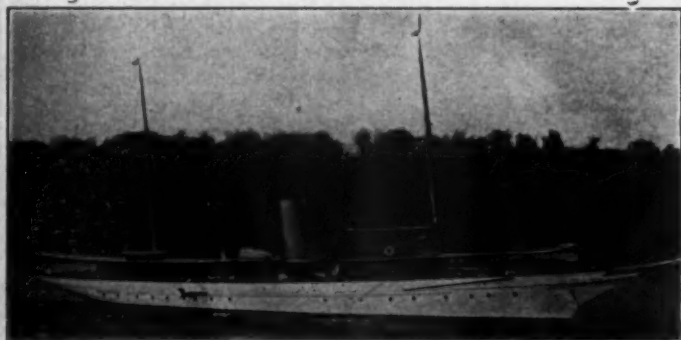
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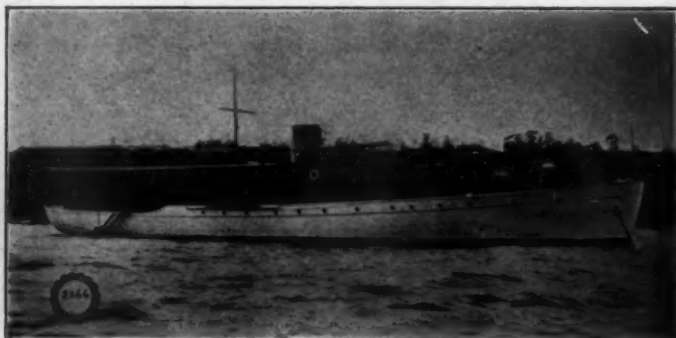
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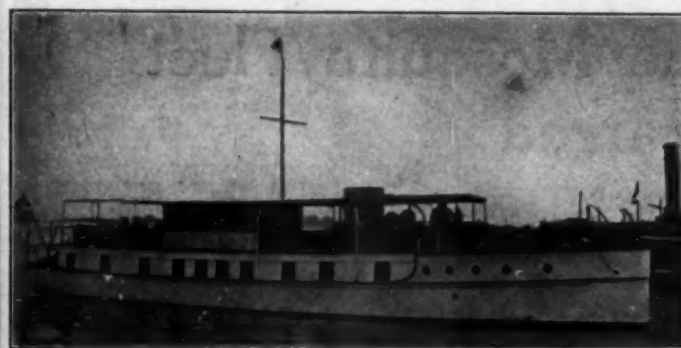
We have a complete list of all steam and power yachts, auxiliaries and houseboats available FOR SALE and CHARTER. A few are shown on this page. Plans, photographs and full particulars furnished on request. Catalogue illustrating types and sizes of yachts we have for sale will be mailed on application.



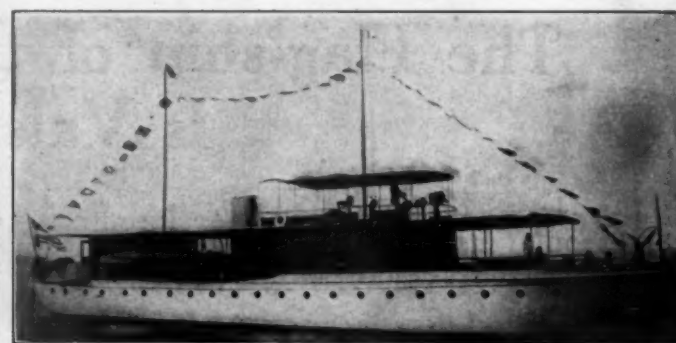
No. 229—For Sale—Fast, twin screw, steel steam yacht, 155 x 18 x 7.6 ft. Speed up to 18 miles. Dining saloon and social hall on deck. Five staterooms, two bathrooms, etc., aft. Handsomely finished and furnished. Cox & Stevens, 15 William Street, New York.



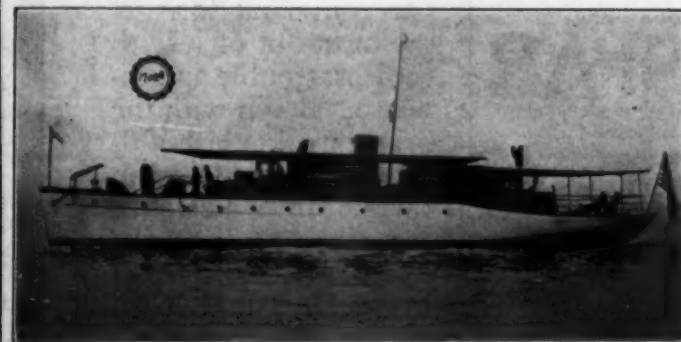
No. 2366—For Sale—Most desirable cruising power yacht of large size available; 126 x 18.6 x 6 ft. Steel construction. Speed 11-13 miles. Large dining saloon on deck; five staterooms, two bathrooms, main saloon, etc., aft. All conveniences. Cox & Stevens, 15 William St., New York.



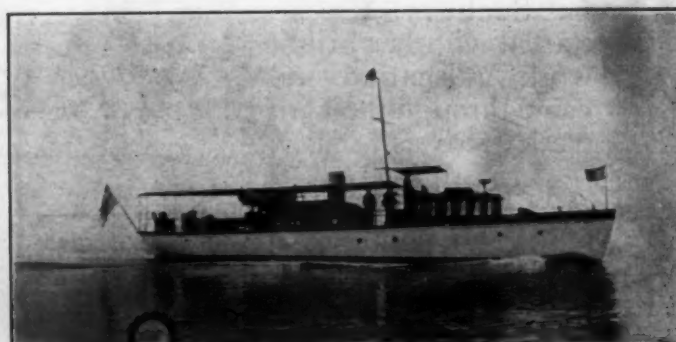
No. 2100—For Charter—Especially desirable, twin screw gasoline houseboat; 95 x 19.3 x 3.3 ft. Speed 12-13 miles. Large social hall on deck, main saloon, four double staterooms, bath, two toilets, etc. Handsomely finished and furnished. Cox & Stevens, 15 William St., New York.



No. 1664—For Sale or Charter—Twin screw cruising power yacht (houseboat type); 110 x 20 x 4.2 ft. Speed 10-12 miles. Dining saloon, smoking room and music room on deck; six staterooms, three bathrooms, hot water heating plant, etc. In commission. Cox & Stevens, 15 William Street, New York.



No. 1702—For Sale or Charter—Fast twin screw cruising power yacht; 90 x 16.6 x 4.6 ft. Speed up to 16 miles. Large deck dining saloon, four staterooms; all conveniences. Cox & Stevens, 15 William Street, New York.



No. 1828—For Sale or Charter—Attractive power yacht; 75 x 13 x 3.6 ft. Speed 11-12 miles; Standard motor. Dining saloon, two double and one single stateroom, bath, two toilets; all conveniences. Cox & Stevens, 15 William Street, New York.



No. 1503—For Sale at Low Figure—Flush deck cruising power yacht; 85 x 15.6 x 4 ft. Speed 12-13 miles; 75/90 H.P. 6 cyl. Standard motor. Large deck saloon, two double staterooms, main saloon, bath, two toilets, etc. Cox & Stevens, 15 William Street, New York.



No. 2022—For Sale—Modern bridge deck cruiser, 55 x 12 x 4 ft.; 6 cylinder, 65 H.P. Sterling motor, new 1916; speed 12 miles. Double stateroom, large saloon, bath and toilet room, etc. Interior finish, African mahogany. Large bridge and after deck. Cox & Stevens, 15 William St., New York.



No. 3251—For Sale or Charter—Modern gasoline houseboat; 62 x 16.6 x 3.6 ft. Speed 8-9 miles. Large saloon with three transoms, two double staterooms, bath, electric lights, etc. Now in Florida. Cox & Stevens, 15 William Street, New York.

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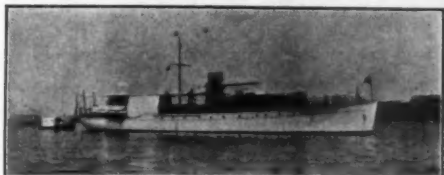
8344—The best 275-foot Steel Ocean-going Cruiser available. Low price. Stanley Seaman, 220 Broadway, New York.



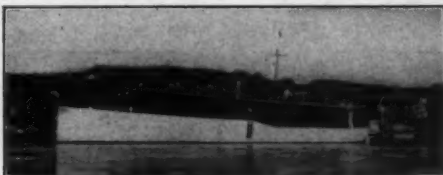
7840—An excellent chance to purchase 155-foot Steel Twin Screw fast Cruiser. Speed up to 18 miles. Low price. Stanley Seaman, 220 Broadway, New York.



5233—Here is a very fine 113-foot Steam Yacht that cost \$60,000, and can be purchased for less than one third. Maintained at about half cost of gasoline yacht same size. Stanley Seaman, 220 Broadway, New York.



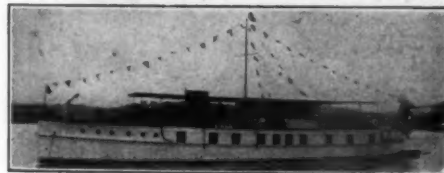
8420—125-foot Steel Twin Screw Seagoing Cruiser with 5 staterooms and 2 baths. Speed 15 miles. Stanley Seaman, 220 Broadway, New York.



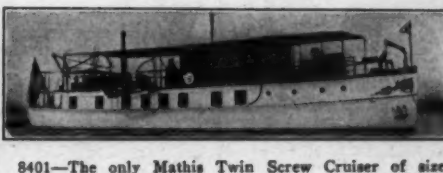
8378—The finest 112-foot Twin Screw Lawley Seagoing Cruiser available. Speed 14 knots. Low price. Stanley Seaman, 220 Broadway, New York.



8448—Lawley Twin Screw Steel Seagoing Cruiser. 110 ft. long. Fine accommodations and conveniences. Stanley Seaman, 220 Broadway, New York.



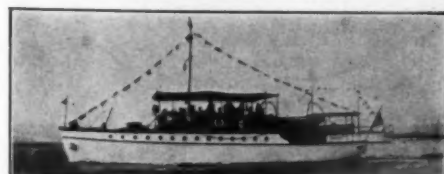
8457—For Charter—95-foot Twin Screw Shoal Draught Cruiser. Ideal for Florida use. Stanley Seaman, 220 Broadway, New York.



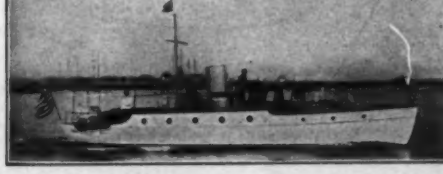
8401—The only Mathis Twin Screw Cruiser of size and type available. Must be seen to be appreciated. Stanley Seaman, 220 Broadway, New York.



8362—Here is the best 62-foot House Boat for Sale or Charter. Now in Florida. Stanley Seaman, 220 Broadway, New York.



8496—57-foot Cruiser with house boat accommodations. 3 staterooms, bath. In commission Miami, Fla. Stanley Seaman, 220 Broadway, New York.



8133—Will sell this 55-foot Cruiser at lowest price of any similar boat available. Condition perfect. Stanley Seaman, 220 Broadway, New York.



8409—Brand new 53 ft. Twin Screw Express Cruiser. Speed 30 miles. Just the type for naval maneuvers. Stanley Seaman, 220 Broadway, New York.



8339—The best 52-foot Coast Cruiser now offered. Price very low. Stanley Seaman, 220 Broadway, New York.



8429—50-foot Matthews Cruiser. New 1914. New 60 Sterling engine 1916. Offer solicited. Stanley Seaman, 220 Broadway, New York.



8147—This 50-foot Twin Screw Express Cruiser. Ready for immediate delivery at bargain price. Speed 15 knots. Ideal for Florida. Stanley Seaman, 220 Broadway, New York.



8045—This exceptionally fine 53-foot Coast Cruiser with 50 h.p. Standard engine, offering large stateroom and saloon. Two toilets. Can be purchased at very low price for immediate sale. Stanley Seaman, 220 Broadway, New York.



8449—45 ft. Matthews "V" bottom Express Cruiser. New 1916. Speed 20 miles. Stanley Seaman, 220 Broadway, New York.



8509—40-foot "V" bottom Express Cruiser. Practically new. Very low price. Stanley Seaman, 220 Broadway, New York.

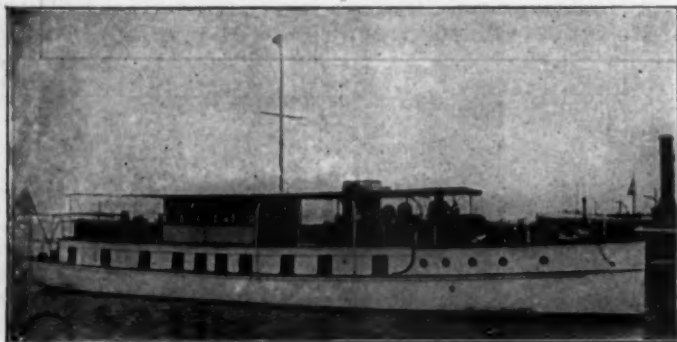
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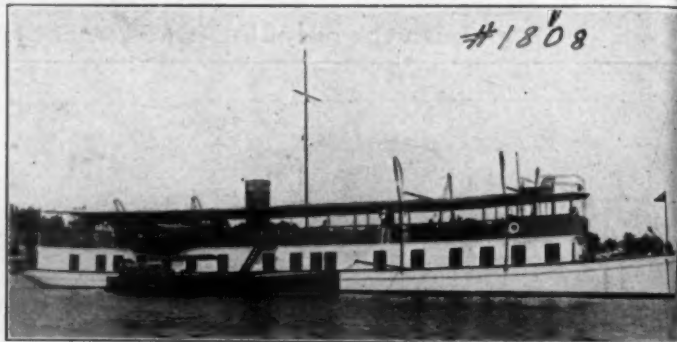
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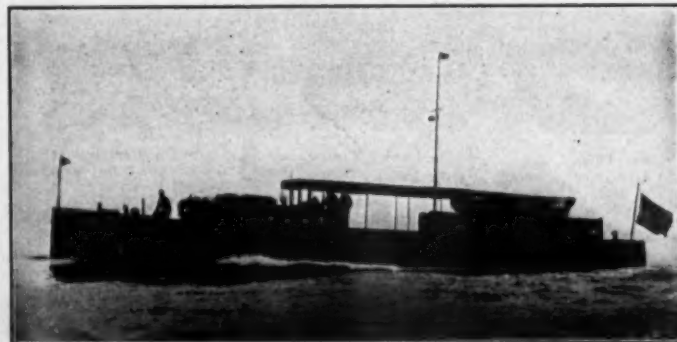
Offer for sale or charter the following yachts, all being ideally suited for Florida waters. We have specialized in Southern charters and can offer the available yachts adapted for Southern cruising.



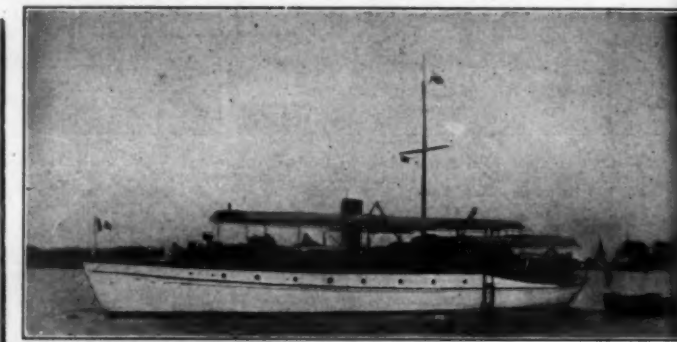
No. 1871—Sale—Charter—Modern motor houseboat. 95 ft. x 19 ft. x 3.3 draft. 4 staterooms, dining saloon, social hall, etc.



No. 1808—Sale—Charter—Twin Screw Houseboat, admirably suited for Southern waters, 125 ft. x 17 ft. 8 in. x 3 ft. 4 in. draft. 4 large staterooms, 2 bathrooms, saloon, etc.



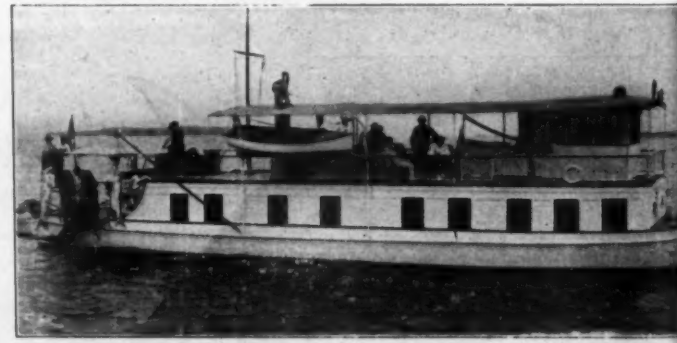
No. 7099—For Sale—Most desirable twin screw day cruiser available, 67 ft. 10 in. x 12 ft. x 3 ft. 9 in. draft. Designed by us; built 1911. Two 20th Century motors. Speed up to 14 miles. Very large cockpit.



No. 7674—Sale—Charter—Modern twin screw motor yacht 75 ft. x 17 ft. 6 in. x 3 ft. 8 in. draft—20th Century motors. Speed, 12 miles. One double and one single stateroom and very large main saloon.



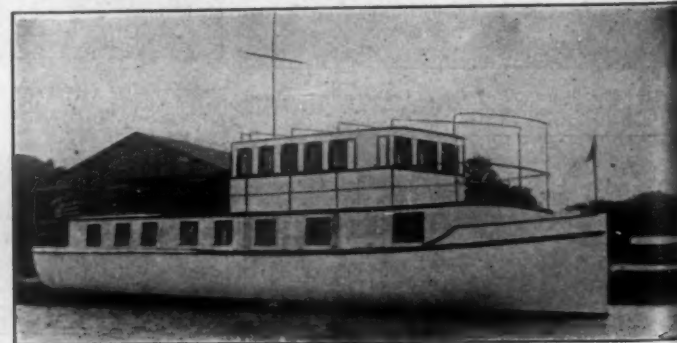
No. 7186—For Sale—Price attractive. Modern 90-foot fast cruising motor yacht, 300 H.P. Standard motor, speed up to 18 miles. Two single staterooms and two saloons. In excellent condition throughout.



No. 1860—Sale—Charter—Desirable Houseboat, 70 ft. x 17 ft. 6 in. x 18 in. draft. 2 35 H.P. Sterling motors new 1915. 3 double staterooms, saloon, deckhouse and bathroom.



No. 1847—Sale—Carter—Shallow draft houseboat, 85 ft. x 18 ft. 28 in. 4 staterooms, large main saloon and bathroom.



No. 1912—Charter—Modern Houseboat, 64 ft. x 17 ft. 6 in. x 3 ft. 2 in. draft. 3 staterooms, main saloon, sitting room on deck, bathroom, etc. Standard motor.

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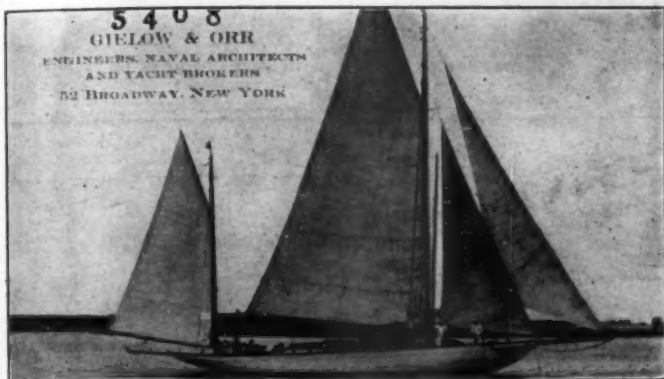
NAVAL ARCHITECTS,
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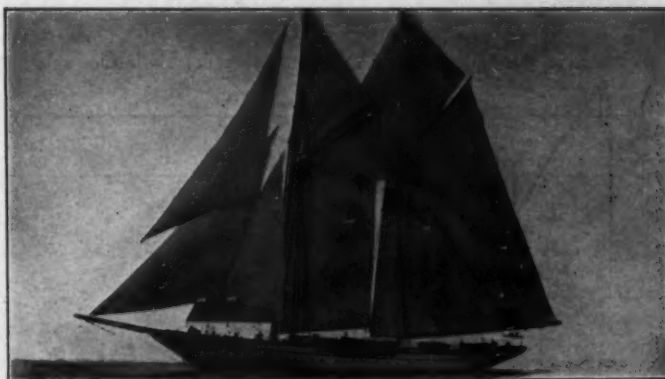
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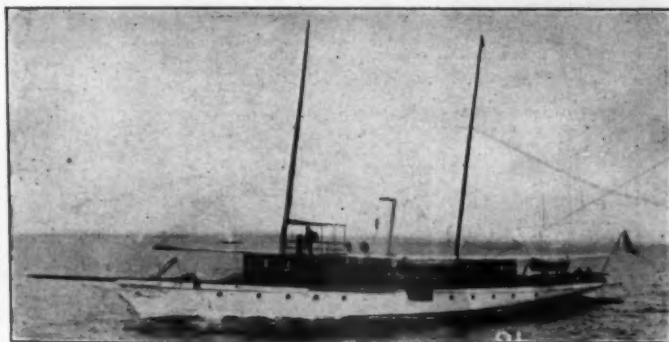
We can offer any yacht available for purchase or charter



No. 5468—For Sale—Smart auxiliary centreboard yawl, 65 feet. Fine cruising accommodations.



No. 434—Sale—Best yacht of its type; 162-foot steel steam auxiliary; good sea boat; fast sailer. Large accommodations.



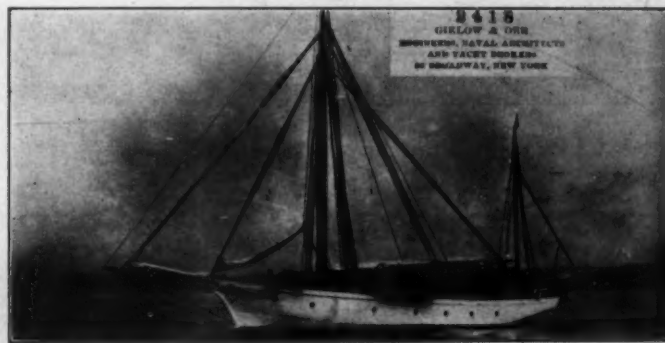
No. 91—For Sale—Attractive 129-foot steel steam yacht; good accommodations and speed. Located Great Lakes.



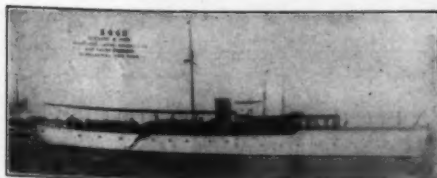
No. 2625—Sale, Charter—275-foot deep-sea cruising steam yacht. Three large deck houses, two double, eight single staterooms, baths. Thoroughly equipped.



No. 3664—Sale, Charter—Able 105-foot twin screw flush deck power yacht. Speedy and unusually seaworthy. Deck dining room.



No. 2418—For Sale—54-foot auxiliary yawl. One double, one single stateroom. Designed for off shore cruising. Has made trip to Bermuda.



No. 3442—Sale, Charter—Handsome 118-foot twin screw steel motor yacht. Good accommodations. Complete equipment.



No. 5434—Sale, Charter—65-foot power houseboat; located Florida. Three staterooms, bath room, main cabin and large deck house.



No. 4389—Sale, Charter—Located Florida. 70-foot twin screw power houseboat. Three double staterooms, bath room, etc.

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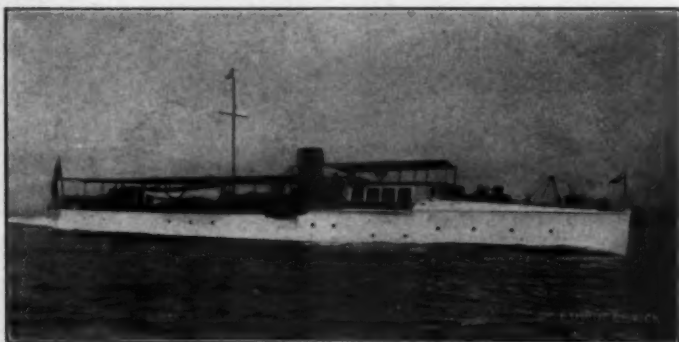
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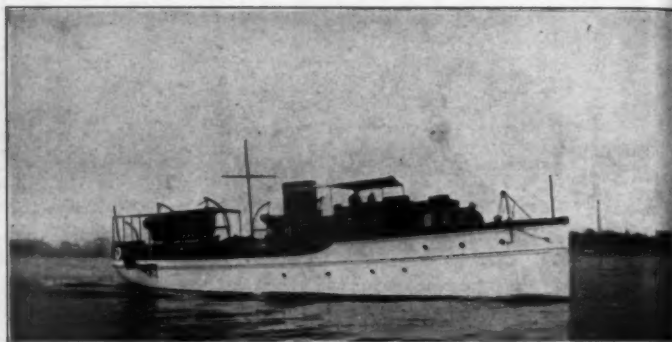
 Cable Address
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We have a complete list of Yachts of every description for sale and charter.

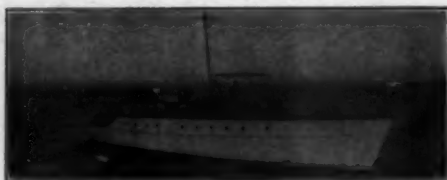
Plans, Photos and full particulars furnished on request



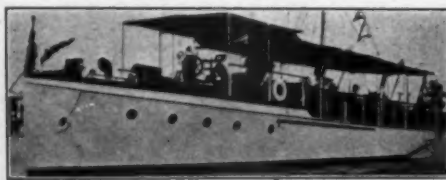
No. 618—Steam Yacht, oil burner, 135 x 16 steel construction, 4 staterooms, dining saloon, library, etc. Large cruising radius.



No. 2112—Modern cruiser 80 x 13.6; two six cylinder Sterlings; good interior arrangement; used only two seasons.



No. 1516—Raised deck cruiser, 70 x 12, Twentieth Century motor, complete equipment, mahogany finish.



No. 1880—Able Cruiser, 60 x 12, built 1913, new 6-cylinder motor, bridge control. Good accommodation.



No. 1958—Attractive cruiser, 65 x 13, engine control on deck. 20th Century motor, good interior arrangement.



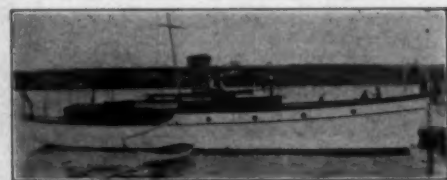
No. 1960—Desirable cruiser, 65 x 12; best condition; complete outfit; 60-80 H.P. motor; price reasonable.



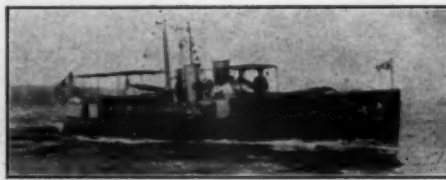
No. 1837—Staunch Cruiser, twin screw, 50 x 13, light draft, Standard motors. In commission.



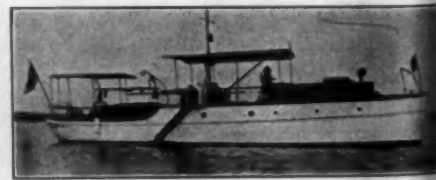
No. 64-H—Florida Houseboat, 62 x 17, light draft, tunnel stern, 50 H.P. motor, large accommodations.



No. 1971—Bridge deck cruiser, 55 x 12, Sterling motor 65 H.P.; new 1916; double stateroom, bath, saloon, etc.



No. 2068—High Speed 56 ft. Cruiser, 8-cylinder 150/180 H.P. Sterling engine, speed 20 miles.



No. 1956—Desirable cruiser, 52 x 11.6. Twentieth Century motor, everything in good condition. Price reasonable.



No. 1625—Twin Screw 60 ft. motor boat, two new six-cylinder Sterlings; speed 15 miles.



No. 2269—Fast, seaworthy motor boat, 45 x 11, built 1914, six-cylinder motor, speed 16 miles, price attractive.



No. 2167—Modern 50 ft. Cruiser, six-cylinder Sterling motor. Cabin, two double staterooms, etc.

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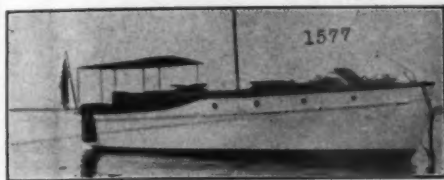
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Yachtbroco, Newyork

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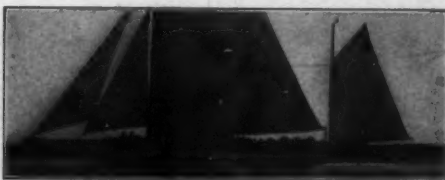
New York City

Surveying
Marine Insurance

Our list comprises all the available yachts for sale and charter. Below are a few of our offerings. If none of these appeal to you, write us your requirements. Our knowledge of the yachts we offer, and our 22 years' experience in the business, insure satisfaction to any one buying or chartering a yacht through this office.



No. 1577—40-foot cruiser. Two staterooms and saloon, sleep 6 people. Electric light, etc. Speed 9 miles.



No. 4141—95-foot auxiliary keel yawl. Three staterooms; two berths in saloon. Two bathrooms. Sterling Engine. Electric lights. Best yawl of her size afloat.



No. 1599—50-foot cruiser. Two double staterooms and saloon. Sleeps eight people. Bath, etc. Sterling Engine.



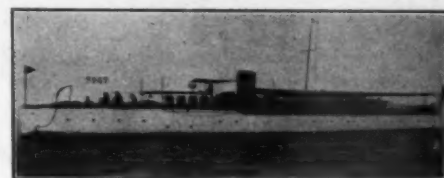
No. 1080—40-foot cruiser. Three berths in cabin. Two pipe berths in engine room. Speed 9 to 10 miles.



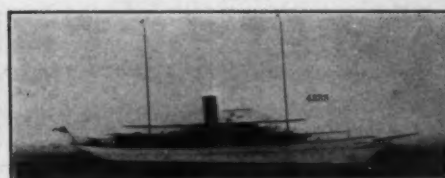
No. 1826—52-foot bridge deck cruiser. Stateroom and saloon, etc. Speed 12 miles.



No. 1419—110-foot twin screw steel power yacht. Six staterooms, large dining saloon, social hall, two baths. Exceptionally fine craft. Speed 14 to 16 miles.



No. 3967—135-foot steel express steam yacht. Four staterooms, dining saloon, main saloon, two bathrooms, etc. Speed up to 17 miles.



No. 4233—200-foot twin screw steam yacht. Oil burner. Eight large staterooms. Dining saloon, music room, four bathrooms, etc. Speed 15 knots. Has cruised to Europe etc.



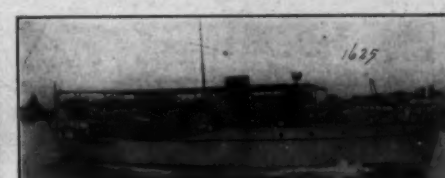
No. 1211—120-foot twin screw steel power yacht. Three double staterooms, main saloon, dining saloon, two bathrooms, etc. Speed up to 18 miles.



No. 3289—130-foot twin screw express steam yacht. Two double staterooms, main saloon, dining saloon, bath, etc. Speed up to 35 miles.



No. 1339—70-foot twin screw power yacht. Stateroom, large saloon, dining saloon, bath, etc. Speed 13 miles.



No. 1625—60-foot cruiser. Two staterooms and saloon, bath, etc. Speed 11 to 12 miles.



No. 1362—55-foot cruiser. Double stateroom and saloon, sleep six.



No. 1825—60-foot cruiser. Double stateroom, main saloon and dining saloon, bathroom, etc. Speed 10 miles.



No. 4145—40-foot auxiliary centreboard yawl. Sleeps four. Speed 5 miles.



No. 1529—65-foot cruiser. Double stateroom, dining saloon and main saloon, bathroom, etc. Speed 12½ knots.



No. 1549—55-foot twin screw bridge deck cruiser. Stateroom and saloon. Sleep six. Speed 12 miles.



No. 1265—50-foot cruiser with auxiliary sails, double stateroom and saloon, toilet room, etc. 30-40 H.P. engine. Now in Florida. Bargain.

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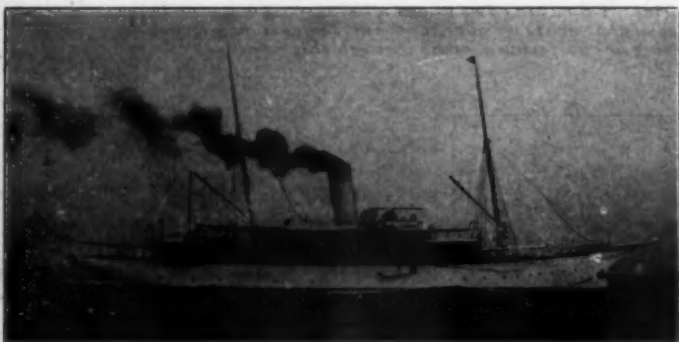
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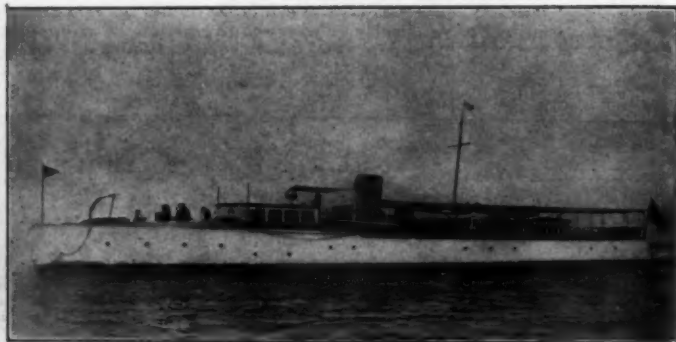
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Description, Prices on Request

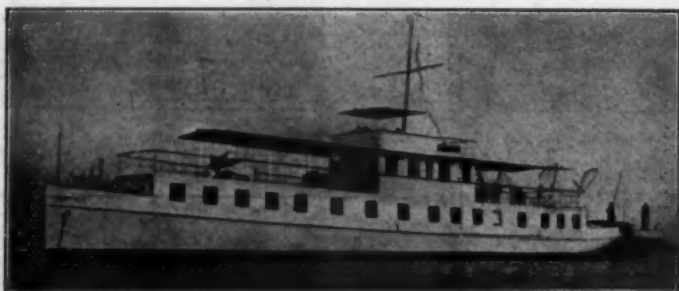
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No. 3904—200 ft. Steam Yacht; in excellent condition; reasonable price.



No. 4806—135 ft. Steel Oil Burning Steam Yacht; good speed.



No. 5831—For Sale or Charter—110 ft. Power Houseboat; good accommodations; good speed.



No. 5929—85 ft. Gasoline Yacht; Standard engine; good condition; reasonable price.



No. 708—43 ft. Power Houseboat; now has pilot wind-shield; Standard engine.



No. 7161—50 ft. Gasoline Cruiser; new Sterling engine this year; excellent condition.



No. 1071—60 ft. Express Cruiser; new boat offered at a bargain price.



No. 6443—43 ft. Raised Deck Cruiser; stateroom and saloon; Sterling engine.



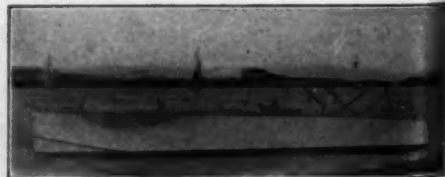
No. 4083—47 ft. W. L. Auxiliary Yawl; in excellent condition; low price.



No. 6206—Desirable 60 ft. Cruiser; Sterling engine; A-1 condition.



No. 3056—40 ft. Express Cruiser; built 1916; speed 25 miles per hour.



No. 6914—28 ft. Express Runabout; high speed; good condition.

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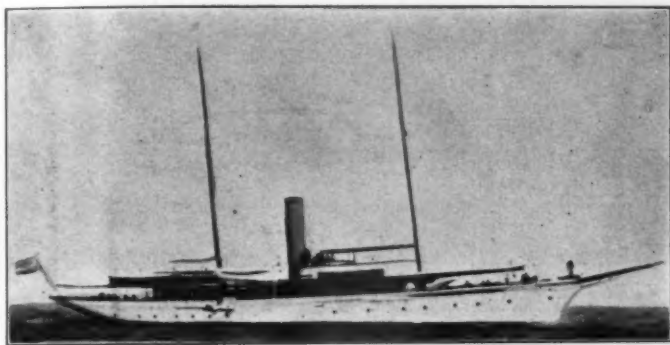
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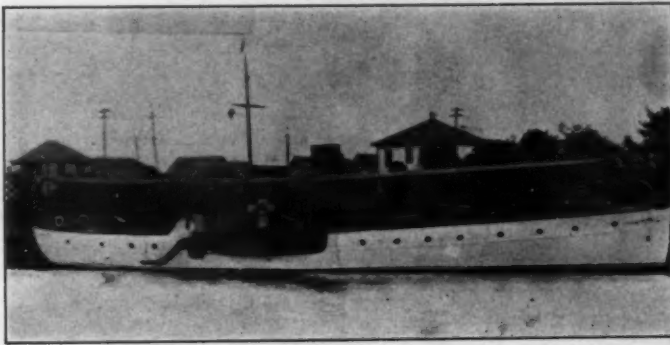
We can offer a number of attractive motor boats, express and cruiser types, 1916 construction, not regularly on the market, as well as all the best steam and other type of yachts available.

42 BROADWAY

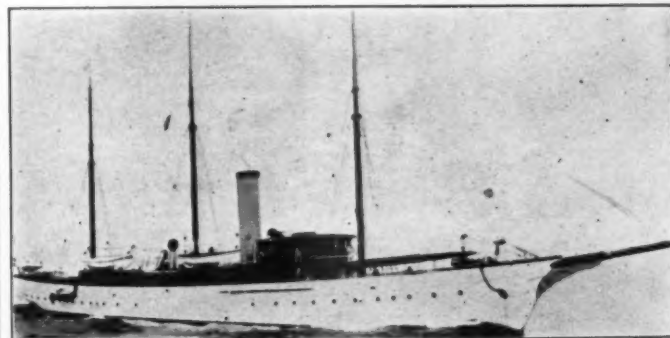
NEW YORK



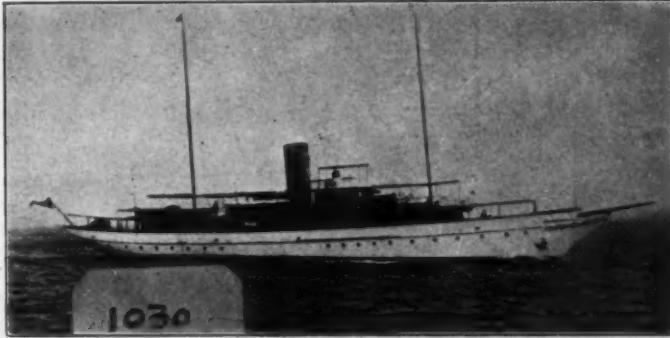
No. 1101—Sale or Charter—165 ft. cruising steam yacht. 3 double and 3 single staterooms. 3 baths. Dining and main saloon, also social hall. Fine seaboard. Economical to operate. A-1 condition.



No. 5243—For Sale—Twin screw flush deck motor yacht, 90 ft. x 15 ft. 3 in. x 4 ft. 9 in. draft. Good accommodations. Fine seaboard. Best bargain of size on the market.



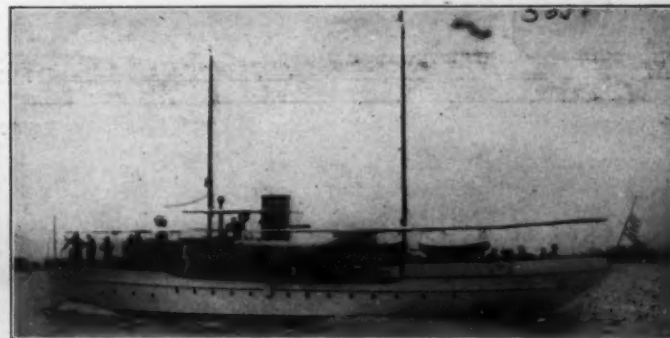
No. 1008—For Sale at attractive price to close an estate—245-foot steel, steam yacht. Well adapted for offshore or coastwise cruising. Fine accommodations. Good condition.



No. 1030—For Sale—205-foot twin screw, steel, steam yacht. Triple expansion engines. Two Babcock & Wilcox boilers arranged for burning oil fuel. Cruising radius about 6500 miles at 10 knots per hour. Built 1913. Speed up to 15 knots. Every modern improvement.



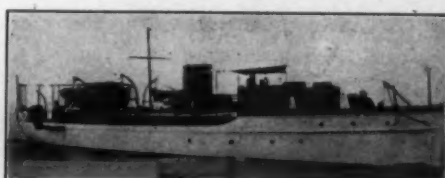
No. 5055—For Sale—110 ft. steel motor yacht. Speed up to 17 miles. 6 double staterooms. 2 bathrooms. Dining saloon and social hall in deck house. First class condition.



No. 5051—For Sale—Best 98-foot twin screw motor yacht available. 17 ft. 2 in. beam. 5 ft. 6 in. draft. Speed up to 16 miles. Built 1913. Unusual accommodations. High class throughout. A-1 condition.



No. 1057—For Sale—135 ft. steel, steam yacht. Speed up to 16 miles. Oil burning boiler. Excellent accommodations.



No. 5049—For Sale—Best modern 80-foot twin screw motor yacht available. Practically new. Large bridge and after deck. Fine quarters for owner and guests. Dining saloon in deck house. Sterling motors. Speed up to 15 miles. Completely found.



No. 5335—For Sale—58-foot twin screw express cruiser. Built 1916. Mahogany hull. 8-cylinder Sterling motors. 26½ miles.

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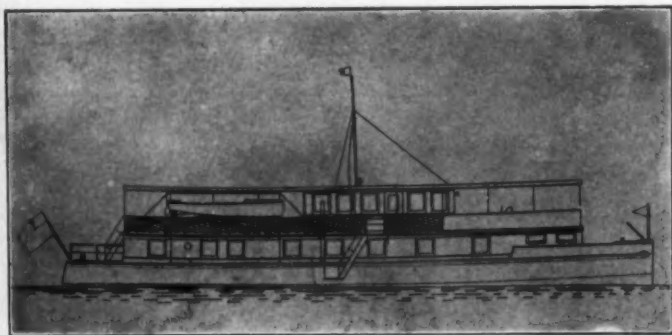
SOUTHERN YACHT AGENCY

American Building

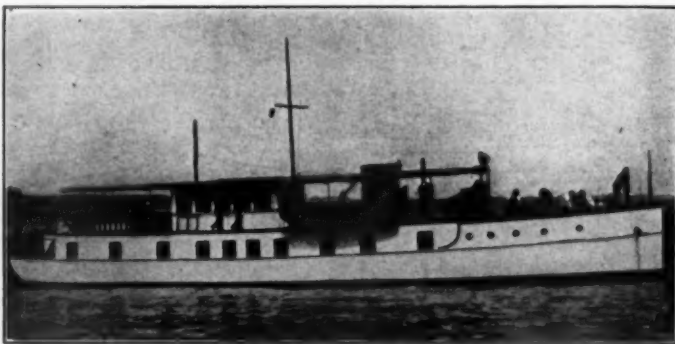
Baltimore, Md.

We have on our list all the desirable yachts available for sale or charter

Some representative boats are shown on this page



No. 750—Sale or Charter—Light draft houseboat. 85 x 18. Standard motor. Hot and cold water. Also salt water bath. Large deckhouse. Four double staterooms and dining saloon below deck. Florida delivery.



No. 683—Charter—Twin screw house yacht. 95 x 19.3 x 3.3. Dining saloon, four double staterooms and bath below deck. Heated. Wireless. April Charter. Florida delivery.



No. 736—For Sale or Charter—62 ft. over all, 3 ft. 6 in. draught. Two double staterooms, bath, deckhouse and dining saloon. Practically new. Florida delivery.



No. 357—Charter—70 ft. The excellent accommodations and equipment of this yacht make it one of the best for Southern cruising. New Twentieth Century motor. Florida delivery.



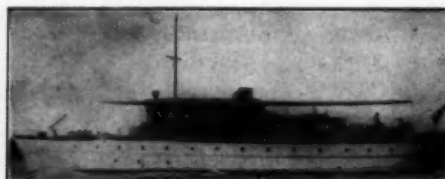
No. 681—Charter—68 x 13 x 4. Twin screw. Saloon, two double staterooms, bath, etc. Especially well adapted for Southern cruising. Attractive price. Florida delivery.



No. 655. Twin screw, 90 ft. Excellent accommodations. Very able. Attractive selling price. Southern or Northern delivery.



No. 738—Sale—Houseboat, 51 x 15.5 x 3. Standard motor. Saloon, one single and two double staterooms.



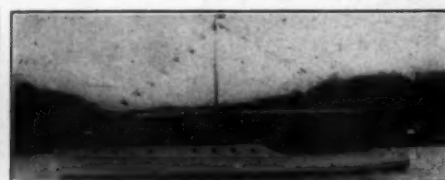
No. 609—Sale—72 x 12 x 3.6. Twin Screw—Speedway motors. Dining saloon and galley in deckhouse. 3 double staterooms and saloon below. Price attractive.



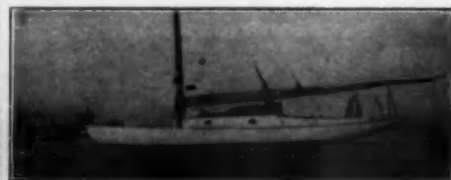
No. 514—Sale or Charter—75 ft. twin screw Standards. Very desirable. Florida delivery.



No. 709—Sale—46 feet. 32-37 H.P. Standard 4-cylinder. Speed 11 miles. Very handsome. Absolutely good as new. Would also consider trading as part payment for larger boat.



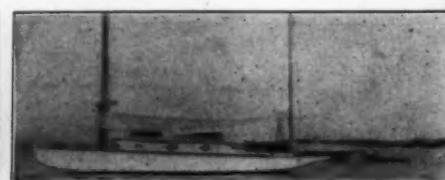
No. 574—Sale—58 x 12.6 x 3.4. Twentieth Century motor. Fast and able. Perfect condition.



No. 556—Auxiliary sloop. 37 x 27 x 8.6 x 4.6. Excellent condition. Well built. Sell cheap.



No. 721—Cruiser, 33 x 9.3 x 3. Built 1914. 4-cylinder, 4-cycle Palmer. Speed 9 1/2 miles. Double cabins make unusual accommodations. Perfect condition. Remarkably able. Sell very cheap.



No. 711—Auxiliary Yawl. 38 x 25 x 8.7 x 5.6. Excellent condition. Well built. Sell cheap.

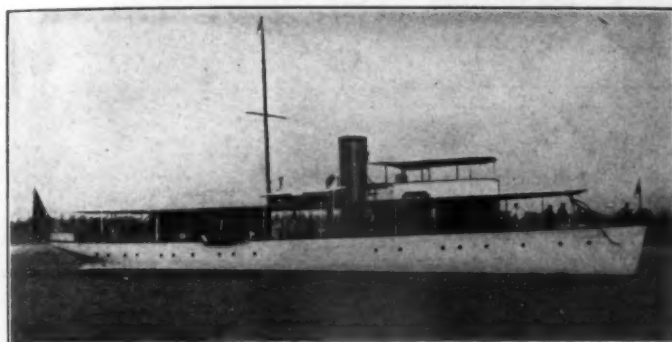
EDWARD P. FARLEY CO.

NAVAL ARCHITECTS YACHT BROKERS

Tel. Harrison 1344

80 E. JACKSON BOULEVARD, CHICAGO, ILL.

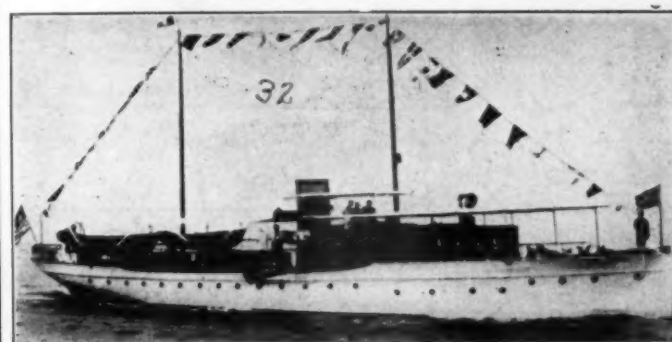
WE OFFER FOR SALE AND CHARTER the most desirable boats of all types on the Great Lakes and Coasts. Plans, photographs and full particulars furnished upon request.



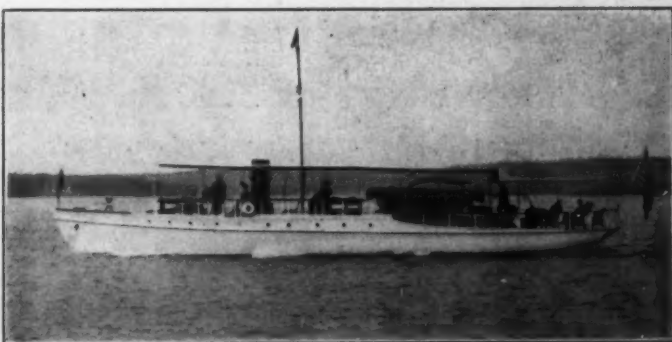
No. 606—For Sale—Modern 122 ft. steel steam yacht. Splendid accommodations. Two deckhouses. Five staterooms.



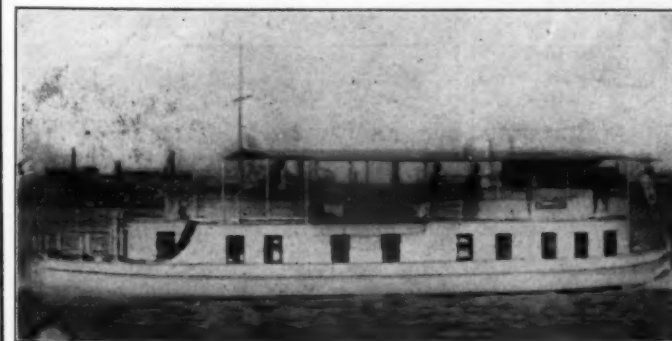
No. 520—For Sale—Auxiliary ketch. 46 x 14 x 4 ft. Built 1914. Accommodations 4-6. Complete equipment.



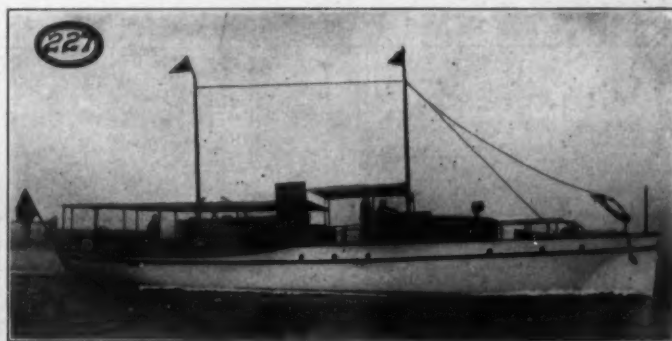
No. 32—For Sale—Modern 98 ft. twin screw cruising yacht. Excellent accommodations and an unusually fine sea boat. Price attractive.



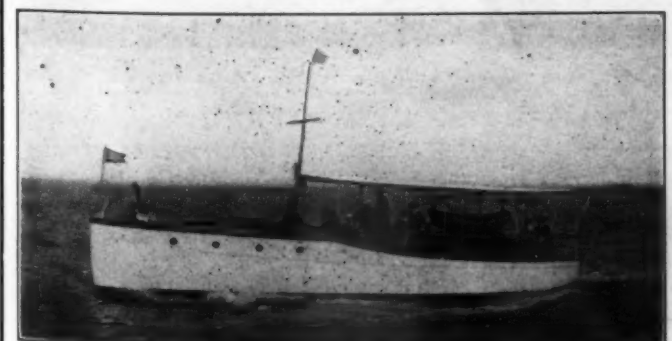
No. 103—Bargain. A very attractive twin screw motor yacht. 75 x 15 x 4 ft. Two staterooms. Complete equipment. Now in Southern waters.



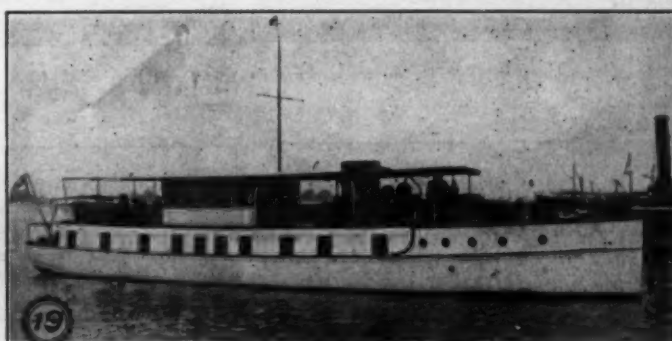
No. 14—For Charter—70 ft. shallow draft houseboat. Three double staterooms. Saloon and bath. Now in Florida.



No. 227—For Sale—Finest gasoline power yacht of moderate size available. 40 x 16 x 5 ft. 6 in. Built by Lawley 1915. Two double staterooms. Bath. Two toilets. All modern conveniences. Speed 14 miles. Winton motor. Handsomely fitted and furnished.



No. 768—For Sale—45 ft. Elco cruiser. Standard motor. Double stateroom; saloon; two toilets. Large cruising radius. Low price for immediate sale.



No. 19—For Charter—Desirable 95-ft. power houseboat. Social hall on deck. Four double staterooms. Modern appointments.

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G.W. FORD YACHT AGENCY

All the available
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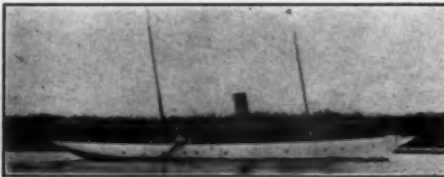
Telephone
3558 Murray Hill
Cable Address
"YACHTFORDNY"
Western Union Code

ESTABLISHED 1911

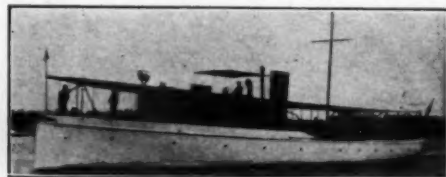
LIMITED FACILITIES FOR HANDLING A FEW OF THE BEST YACHTS



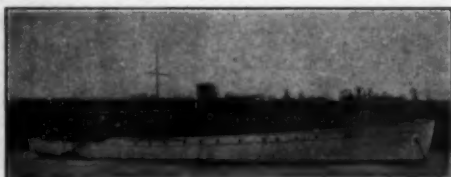
5—Steel twin screw steam yacht, 227 ft. O.A. One of the fastest in the fleet. G. W. Ford Yacht Agency.



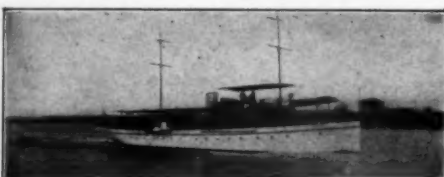
67—Flush deck steam yacht, 118 ft. x 15 ft. Fine condition. G. W. Ford Yacht Agency.



2106—Sale or Charter—112 ft. twin screw Lawley coast cruiser. Craig motors. G. W. Ford Yacht Agency.



2101—Steel motor yacht, 126 ft. O.A. Very able. Considered one of the best. G. W. Ford Yacht Agency.



346—Twin screw 98-foot gasoline yacht. Fine crew's quarters.



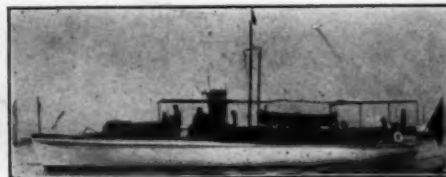
2104—Real Bargain—53 ft. motor yacht. 50 H.P. Standard engine, mahogany finish. G. W. Ford Yacht Agency.



2038—Beamy twin screw houseboat. 68 ft. x 23 ft. Fine accommodations. G. W. Ford Yacht Agency.



2096—Bridge deck cruiser. Built 1914. New 6-cyl. Sterling installed 1916. G. W. Ford Yacht Agency.



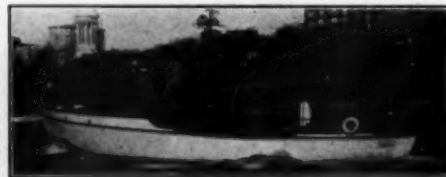
2107—Attractive bridge deck cruiser, 60 ft. O.A. Speedway motor. G. W. Ford Yacht Agency.



2072—Brand new 50 ft. bridge deck cruiser. 6-cyl. motor. Launched 1916. G. W. Ford Yacht Agency.



2016—Able bridge deck 50 ft. cruiser. 40 H.P. Has bath. Price low. G. W. Ford Yacht Agency.



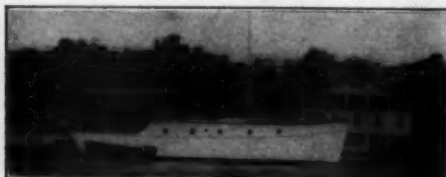
2105—Lawley built bridge deck cruiser, 45 H.P. Beautifully finished. G. W. Ford Yacht Agency.



2064—Able motor cruiser 40 ft. single hander. In good condition. G. W. Ford Yacht Agency.



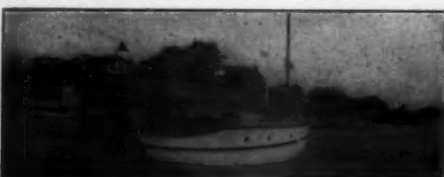
2079—Substantial 53 ft. cruiser offered at attractive figure. Elaborate mahogany finish. G. W. Ford Yacht Agency.



2103—Attractive 32 ft. x 9 ft. cruiser with four-cycle motor. Seen near New York. G. W. Ford Yacht Agency.



2098—Able 26 ft. raised deck cruiser, Mianus motor. G. W. Ford Yacht Agency.



2102—Probably the staunchest cruiser afloat. 37 ft. x 13 ft. four-cycle motor. Price reasonable. G. W. Ford Yacht Agency.



2099—Sale or Charter—28 ft. raised deck cruiser, Lathrop motor. G. W. Ford Yacht Agency.

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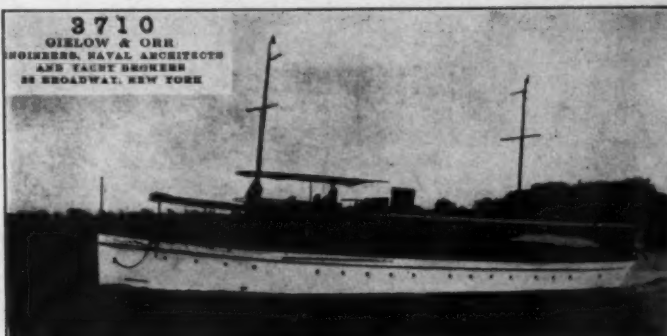
52 BROADWAY, NEW YORK

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Cable Address
Crogie, New York
A. B. C. Code

We can offer any yacht available for purchase or charter



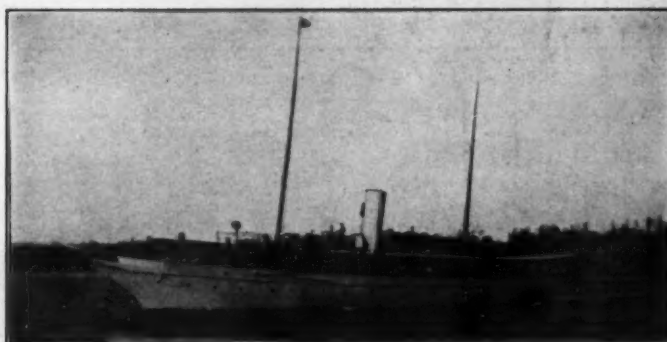
No. 3659—Sale, Charter—Located Florida; 99-foot twin screw power yacht. Excellent ventilation. Three double staterooms. Large deck space.



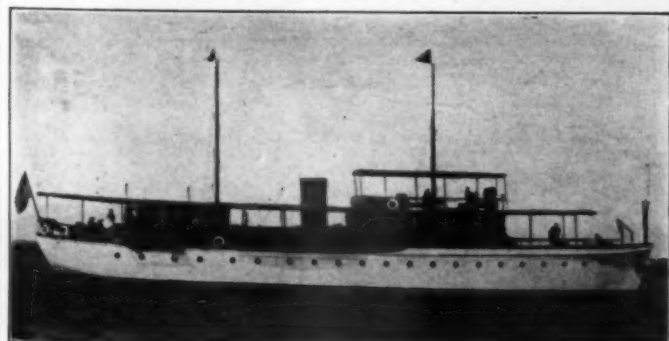
No. 3710—Sale, Charter—99-foot twin screw, Florida draft, motor yacht. Unusual accommodations.



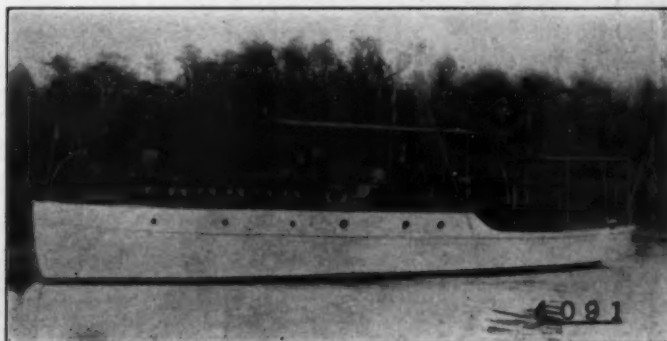
No. 5525—Sale, Charter—Fast cruiser, only a few months old; 3 staterooms; available for South.



No. 454—Bargain—139-foot twin screw steel steam yacht. Two double, three single staterooms, baths, etc.



No. 5674—For Sale—Offered by an Estate—110-foot twin screw power yacht. Ideal for Southern and Northern cruising. Two large deck houses, one double, five single staterooms, three bath rooms.



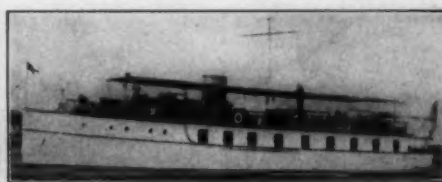
No. 4091—For Sale—Bargain—52-foot bridge deck cruiser. Good able seaboat. Double stateroom, bath room, etc.



No. 5627—Sale, Charter—45-foot Elco Bridge Deck Cruiser. Large Accommodations, including owner's private stateroom. Fine boat for Florida.



No. 3674—For Charter—Exceptionally roomy 68-foot Twin Screw Motor Yacht. Dining room, two staterooms, bathroom. Copper Screened throughout.



No. 3617—Available April, Florida Charter—Especially fine 90-foot twin screw power houseboat. Three double, one single stateroom; two baths. Located Florida.

Naval Architects
and
Yacht Brokers.

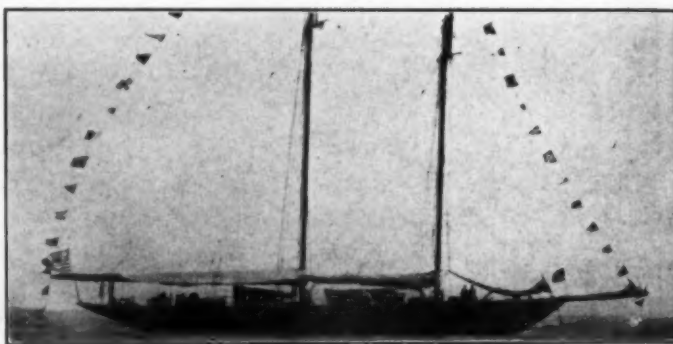
COX & STEVENS

15 William St., New York
Telephone—1375 Broad
Cable—BROKERAGE

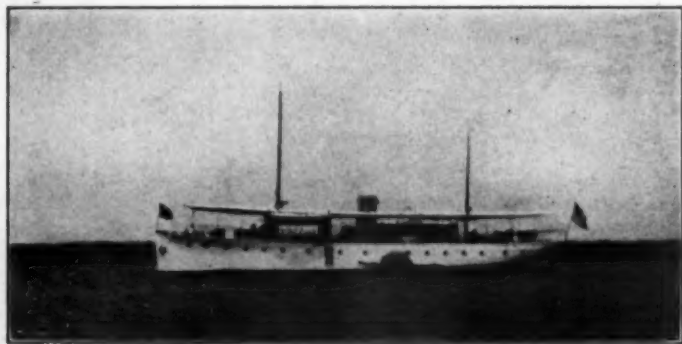
We offer the following Craft which are especially adapted for service in FLORIDA waters. Please advise us of your requirements for this Winter, whether to purchase or charter, and we will gladly submit data regarding suitable boats.



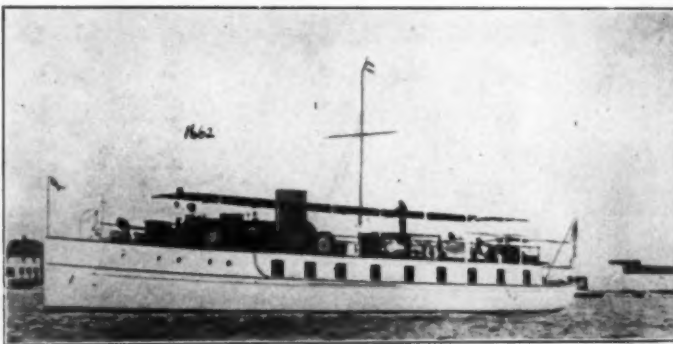
No. 363—For Sale or Charter—Most attractive houseboat of large size; luxuriously furnished; all conveniences; must be seen to be appreciated. Cox & Stevens, 15 William St., New York.



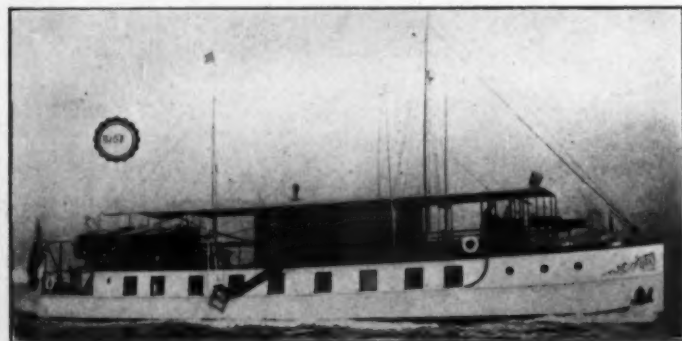
No. 647—For Sale—Modern, flush deck, light draught, auxiliary schooner yacht, 106 x 75 x 24.6 x 5.6 ft. Speed under power 9 knots. Large saloon, three staterooms, two bathrooms, electric lights, hot water heating plant, etc. Cox & Stevens, 15 William Street, New York.



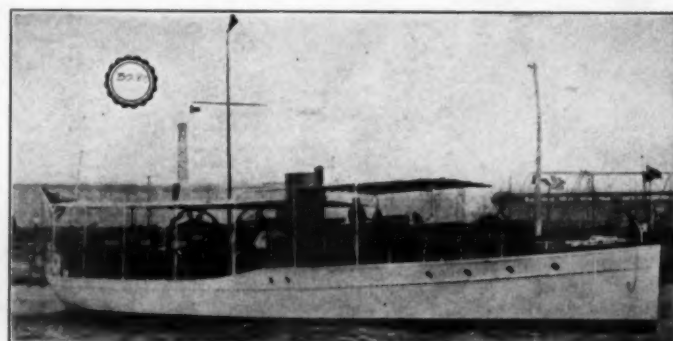
No. 2425—For Charter—Twin screw power yacht; 90 x 16.6 x 4.6 ft. Speed 12 miles. Large saloon, 2 double staterooms, bath and two toilets, etc. Price attractive. Cox & Stevens, 15 William Street, New York.



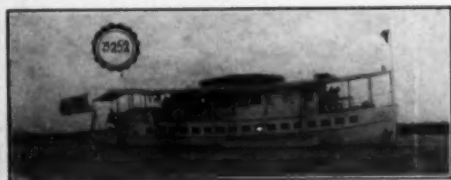
No. 1662—Modern gasoline houseboat, 90 x 17 x 3.5 ft. Speed 10 to 12 miles. Large dining saloon, smoking room, four staterooms, two bathrooms; all conveniences. Best craft of type available. Cox & Stevens, 15 William St., New York.



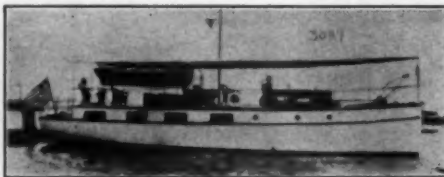
No. 3151—For Charter—Up-to-date, twin screw gasoline houseboat; 77 x 17.6 x 3 ft. Speed 11 miles, large deck saloon, dining cabin, three staterooms, two bathrooms, hot water plant, etc. Cox & Stevens, 15 William Street, New York.



No. 3283—For Charter—Desirable twin screw power yacht; 75 x 16.3 x 3.3 ft. Speed 12 miles. Large dining saloon in deckhouse forward, 3 double staterooms, bath room and 2 toilets, etc. Handsomely finished and furnished. Cox & Stevens, 15 William Street, New York.



No. 3252—For Sale—Twin screw gasoline houseboat; 65 x 17 x 3.6 ft. Built 1914. Two 25 H.P. motors; speed 9 miles. Large saloon, two single and two double staterooms, bath and toilet room, galley, etc. In excellent condition. Fully equipped. Further particulars from Cox & Stevens, 15 William St., New York.



No. 3097—For Charter—Houseboat cruiser; 52 x 14.6 x 3 ft. Speed 8 1/2 miles. One double stateroom, 2 transoms in saloon, toilet room, etc. Now in Florida waters. Reasonable price. Cox & Stevens, 15 William Street, New York.



No. 1387—For Sale—Up-to-date twin screw gasoline cruiser; 65 x 11.6 x 4.3 ft. Speed 13-14 miles; 20th Century motors. Dining saloon forward; two double and one single staterooms, bath, etc., aft. Low price. Cox & Stevens, 15 William Street, New York.

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**Opportunities
for the
Motor Boatman**

Before you buy or before you sell examine the exceptional buying and selling opportunities under this heading. They comprise the best offers of the month. Please mention MoToR BoatingG.



FOR SALE "SPRING MAID"

A Rare Opportunity awaits the one who interests himself in this Fast and Able Express Runabout.

"Nothing but the best" was the order given. Spring Maid, 34' x 5' 8" was designed by L. E. Geary, Naval Architect, Seattle, and built under the direct supervision of Frederick Vogler (formerly with Geo. Lawley & Sons Corporation) in the yards of Markey & Wilson, Seattle. Built from solid mahogany and Port Orford Cedar. Double planked with union oil silk between. Beautifully appointed: Leather Cushions, Wicker Chairs, etc.

Electrically lighted and started.

Power—Van Blerck 8 Cylinder, 5½" x 6", in absolutely perfect condition. Speed from five miles an hour to thirty. Perfect control by one person. Exceedingly seaworthy and dry.

Bronze fittings throughout for salt water.

This is a boat that will please the most discriminating, in fact, she is luxury personified, and is exactly as represented. Will sell for \$4800.00, delivered at any point in U. S. A. Cannot be duplicated for \$6300.00.

Address owner, M. S. BRIGHAM, Seattle, Washington, Washington Apartments.



WANTED—Day Cruiser or fast ferry launch about 40 ft. long by 7½ or 8 ft. beam, built during 1916; speed about 25 miles per hour. Day Cruiser, Detroit. MoToR BoatingG, 119 W. 40th St., New York.

FOR SALE—Lambkin 4-cyl. motor 3¼ x 5¼. Equipment—vacuum fuel feed, magneto rear starter, reverse gear, wheel. Cost \$550. Sale price right. Only run 430 miles. Condition guaranteed absolutely perfect. Geo. A. Hassall, Keokuk, Iowa.

FOR SALE CHEAP—Waterman B2 engine with complete equipment almost new, write to Y. T. Suzuki, Battle Creek, Mich.

WANTED—To buy or lease, small boat yard with marine railway, vicinity of Narragansett or Buzzards Bay preferred. Address H. S. Parkhurst, R. F. D. Bourne, Mass.

1½ H.P. Eclipse motor, good condition, \$20.00. Lot of marine hardware left from boat livery. Write for list Elmer Calkins, Petoskey, Mich.

WANTED—Second-hand, 30 to 40 ft. cabin cruiser not over three years old, in perfect condition, with large deck space. P. T. Frankl, 28 West 63rd St., New York.

MOTORS.

Hundreds of fine motor values from one to six cylinders in all the most desirable sizes of the best high grade makes, at very low prices. Magnetos, carburetors, timers, coils, axles, transmissions, steering gears and supplies of every nature. Send for big free list and state your requirements before buying. Badger Motor Company, Milwaukee, Wis.



No. 2904—For Sale—Roomy power cruiser, 63 x 12.6 x 3.9 ft. Speed 9 miles; 35 H.P. motor. 2 double staterooms, saloon, toilet, galley, etc. Excellent boat for Southern waters. Price low. Cox & Stevens, 15 William Street, New York.

FOR SALE—36-ft. mahogany runabout designed by Wm. Gardner. Engine Wisconsin, 40-50 H.P. 1915 model with auto wheel and control. Rayfield carburetor, Bosch dual ignition; Hyde propeller. Two auto seats behind windshield; two arm chairs and cross seat in stern. Full equipment including auto top with side curtains, windshield, etc. Exceedingly dry and seaworthy. T. Kilpatrick, 86 Kent Ave., Brooklyn.

FOR SALE—One 70 H.P. Sterling Marine engine, thoroughly overhauled, and in first-class condition. Barden Electric & Machinery Co., 111 Main Street, Houston, Texas.

Forty Horsepower Heavy Duty, four-cylinder, four-cycle marine motor, new, an allright machine at less than a right price. Box 10, MoToR BoatingG.

FOR SALE—Two 200 horsepower high-speed Sterling engines, 1916 models. Used very little during the season. Would be sold cheap for cash. Address Box 15, care of MoToR BoatingG.



SALE or CHARTER—50 x 14 x 1½ feet. Deck saloon, main cabin, four staterooms, toilet, and galley. Electric lights. Will install engine if desired. Box 515, Woodstock, Vermont.

Trimount Whistle Blower Outfits

Blower runs by friction contact with engine fly-wheel. Whistle of brass, nickel-plated.

3 sizes, \$10, \$15, \$20.

Trimount Rotary Hand Barge Pumps

All bronze composition. Suction lift 6 to 20 feet. A lifelong convenience.

3 sizes, \$20, \$25, \$35.

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Opportunities for the Motor Boatman

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HOUSEBOAT "MARIEDEE"; built 1916, 48-ft. x 13-ft. 6-in. x 17-in. draft. This elegant, shallow-draft, twin-screw houseboat will be sold at a bargain. 4-cylinder Van Blerck engines, silent chain drive, driving twin screw; mahogany and white enamel finish; bathroom, Sands plumbing; Shipmate range and full galley equipment, hot and cold water, electric lights, open fireplace, with tile facing and mantel; splendid cabin arrangements. If you want the best shoal draft boat on the market to-day, address the owner, W. M. Fowler, Ingleside Place, Macon, Georgia. Boat can be seen at National Boat and Engine Company, Jacksonville, Florida, and is available for immediate service.



FOR SALE at sacrifice—Raised deck, power yacht, 24 H.P. automatic engine, built of cedar and oak with quartered oak cabin and decks. Equipped with electric lights, toilet and all modern conveniences. Will accommodate six comfortably in pilot house, cabin and engine room. Pipe berths in forecabin for crew. Boat located on James River, Va. Handy for Southern waters. Room 2623, 17 Battery Place, New York City.



No. 744—For Sale—51 ft. fast day cruiser. Two Speedway motors. Speed 20-21 miles. Splendid condition. E. P. Farley Co., 80 E. Jackson Blvd., Chicago, Ill.



No. 1393—Nearly new Lawley-built cruising power boat, 35 x 9, two cabins with two berths in each. Designed for off-shore work, built 1915. 32 h.p. Mason-Jacger engine. Separate galley and toilet room. In best possible condition. Apply John G. Alden, 131 State Street, Boston, Mass.

USE "SNAPPER" ENGINES for your small boat. They are a big little engine built by The Automatic Machine Co., Bridgeport, Conn.

WANTED position on motor yacht as captain and engineer.

Competent to overhaul and repair motors, electric lighting plants and batteries.

Familiar with coastal and inside waters.

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Captain-Engineer, care of MoToR BoatingG.

FOR SALE—6-cylinder, 60 H.P. Peerless auto engine, complete, ready to run, a bargain for quick sale. Address C. C. Rucker, K. & H. Hotel, Clarksburg, W. Pa.

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will be sent free for the asking. Your present en-
gine will be taken in part payment for a new Ster-
ling, Kermath, Missouri, Harris, Eagle. Write for
offer.

Spark Plugs

(Continued from page 35)

peated many times on the same insulators without any
sign of fracture. Another feature of the Master plugs
is the provision of ample expansion space between the
insulator and the shell, in order to prevent breakage
of the core, and the makers also lay stress on the
simplicity and superiority of the two-point design.
Master Calorite plugs are made in many types for all
styles of motors.

Rajah

Rajah plugs, which are made by the Rajah Auto
Supply Co., of Bloomfield, N. J., are equally well
adapted for battery or magneto. Only the highest
grades of imported porcelain and electrodes are used,
and the form of the porcelain is declared to be such
that Rajah plugs are as soot-proof as can be. The
construction is simple for cleaning and repairing,
there being only four parts, and they are all inter-
changeable. The plug in this line which is best
adapted to marine and hydroaeroplane service is the
Rajah water-proof. This plug is the same as the regu-
lar Rajah except that there is added to it a high
heat-resisting Condensate protecting part screwed
to the plug bushing and a special nipple covering the
clip terminal on the cable. It is furnished in all stand-
ard sizes with a Rajah regular terminal fitting any
cable, and a Rajah ferrule terminal which makes a
neater connection, will be furnished if a sample of
the cable in use is included with the order. The price
of the Rajah water-proof is \$1.50, postpaid.

Practical Wireless for Motor

Boats

(Continued from page 14)

furnished by the wireless apparatus manufacturer or
friend Wireless Amateur, is effected with fairly heavy
wire, either bare or covered, in the case of a small
transmitter. For transmitter of 1/4 K. W. rating and
over, the wiring can be carried out with brass or
copper strip. In either case the component parts of
the apparatus should be grouped as closely together
as possible to avoid exceeding the 200-meter wave-
length prescribed by the Federal radio regulations for
amateur wireless transmitters.

Since a motor boat station is not to be confounded
with a fixed amateur wireless station, special regula-
tions may sometimes apply to the transmitter of the
former, depending upon the waters frequented by the
craft. In each individual case, therefore, the
owner will do well to secure a copy of Regulations
Governing Radio Communication, obtainable free of
charge from the Commissioner of Navigation, De-
partment of Commerce, Washington, D. C. And, at
the same time, the letter of request may contain a
short description of the transmitting apparatus, the
aerial, and the craft and where it is used, in order
to obtain specific information. If the motor boat
transmitter comes within the realm of the radio
regulations, the owner is notified and must take up
the matter of transmitter adjustment and licenses with
the radio inspector of the district in which his craft
is included, to whom he will be referred. If the
motor boat station must be licensed, the operator of
the set will have to secure an amateur wireless license,
which is procured after passing a simple test in
receiving and sending that serves to prove that he
is sufficiently versed in the dot-and-dash language
not to be a serious menace to those engaged in legiti-
mate wireless communication.

The first step in mastering the Continental code,
which is almost universally employed in wireless com-
munication, is to secure a copy of the code and
memorize the characters. A simple method of doing
this is to memorize, say, four telegraphic equivalents
at a time, then turn the code chart face downward,
and repeat the dot-and-dash combinations for the
different characters. In this manner it will be found
a comparatively simple matter to master the entire
telegraphic alphabet, the numerals, and the more
common of the additional signs and punctuation
marks. If the student provides himself with a
telegraph key and battery-operated buzzer, he will find
it better practice to operate the key for each character
of the code instead of repeating the equivalents in
his mind or marking the dots and dashes on paper; in
fact, the use of a buzzer practice set is strongly recom-
mended since it trains the ear coincidentally with the
memory.

Once the code is memorized, the next step in the
training of the student is to accustom the ear and
the mind to the characteristic rhythm of the Conti-
nental equivalents. During this phase of the training
it is best to enlist the services of another person,
preferably friend Wireless Amateur again, or some
other, who has had some training in the code, although
this is not imperative. With pencil in hand, the
student should write such characters as he recognizes
while the companion is slowly sending different letters
by means of the buzzer practice set. An equally ef-
fective, although more difficult, method is to listen
in on a wireless receiving set, writing down on paper
such characters as are identified. At first the student
will perhaps spend an entire evening with only a few
scattered letters and punctuation marks, but all the
while he is getting the ear more and more accustomed
to the wireless code equivalents.

The letters of the alphabet and not the dot-and-dash
combinations, should be copied down, for at the
usual speed of transmission it is almost impossible
for even a fast writer to put the dots and dashes on
paper. Furthermore, even if it were possible it
would necessitate the transcribing of the telegraphic
notes so obtained, leading to much trouble and more
errors.

It should not be many weeks before the student-
operator is able to copy down whole words in a
sentence, which, with a little imagination, may enable
him to "get the drift" of entire messages. If ever
there was a case where persistency never failed of
reward it is in this form of practice; and it is only
a matter of a month or two, or perhaps a little longer,
and the student-operator has become a skilled operator,
ready to pass any examinations that may be necessary
to procure an amateur operator's license, if need be.

Is the result worth the effort and expense? Does
it pay to install a wireless set on board a motor boat
and then go through a training course of several
weeks or months?

The answer will be found in the initial article of
this series. If you have forgotten its contents to a
greater or less degree, go back to it, for the multitu-
dinous advantages of a wireless station were then covered
at length. And after the pleasure, convenience, safety,
and other features of a wireless station are borne in
(Continued on page 56)

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Mason Machine Works
Taunton, Mass.
New 1916 Model Marine Engines

(Continued from page 55)
mind, do not overlook that of membership in the fraternity of wireless amateurs, which goes with the ownership of a wireless equipment. You will make new acquaintances miles away without ever seeing them, with whom you will spend night after night in pleasant conversation; and when once your set is in operation there need never be a dull moment on board the boat.

Motor Boating in the Jungle

(Continued from page 17)

all along the various rivers, and nearly all are navigable for good-sized motor boats for many miles. But go slowly and keep a sharp lookout when thus motor boating through the jungle, for fallen trees known as "jacubas" often obstruct the channels, the turns and bends are sharp, and now and then one may unexpectedly come upon an Indian canoe or a heavy boat, laden with firewood, and if you are not proceeding slowly it will be too late to avoid a collision or running upon the bank.

There is something marvelously fascinating about traveling up these creeks through the wilderness. On every hand rise the great vine-draped trees, graceful palms with curved and twisted trunks jut outward over the water, lianas and creepers trail downward from overhanging branches and masses of gigantic Arums form miniature flower-decked islands. Here passing breezes never ruffle the glassy surface of the water, which is stained a deep red-brown by the vegetation, and on its oil-like bosom the surroundings are reflected in marvelous manner. So perfect in every detail, so wonderfully mirrored are the banks, the forest and the vegetation, that one cannot say where water ends and land begins, and one seems to be gazing into some upside-down forest rather than at the surface of the creek.

If you are fond of hunting or fishing, by all means secure the services of a young Indian and vary your cruises on rivers and creeks by excursions into the jungle. There are no better hunters in the world than the Guiana Indians, and your bronze-skinned companion will lead you to game of whose presence you never dreamt. Here in the wilderness are deer, capybara, paca, agouti, peccaries, tapir, tiger cats, ocelots, puma and even jaguar, to say nothing of the monkeys, the great black turkey-like curassows, the gamey, shy pheasants, besides scores of lesser furred and feathered game. The creeks and rivers teem with fish, some of which grow to enormous size and take a hook readily, while others can only be obtained by the Indians who shoot them with bow and arrow—a marvelous feat, which once seen will never be forgotten.

But beware of bathing in these creeks and rivers. Alligators are there, of which you need have no fear, but many of the streams swarm with the dreaded piraia, the man-eating fish, which though small in size is so ferocious and has such powerful jaws and knife-like teeth, that it can mutilate and tear a man to pieces in a few moments. However, there are plenty of places where it is safe to bathe and your Indian can point out such spots infallibly.

If your boat is large enough you may spend the nights on board, moored to the jungle-covered shores of creek or river, or by stretching a tarpaulin or a square of canvas between the trees you may sleep soundly and comfortably in a hammock swung in its shelter. It is perfectly safe, as there are no prowling beasts or reptiles which will disturb you, while mosquitoes are practically unknown in the Guiana bush. You may hear a jaguar scream in the depths of the forest and the howling monkeys will rouse you at dawn with their fiendish cries, but they will not come near your camp in the jungle and you will find it a novel, interesting experience.

Reliability First

(Continued from page 27)

design, having speed and seaworthiness in equal proportions, or again, it may be of the express cruiser class.

For the first and last types the answer is easy. The first boat needs a slow, heavy-duty engine, suitable for the slow turning towing wheel the boat needs. The last should be equipped with a high-speed engine for obvious reasons.

The answer for the second type is not so easy, but as this is probably the boat that is meant we shall try to analyze the situation.

First, as far as durability and reliability are concerned, any type of engine will be satisfactory, notwithstanding lots of criticism to the contrary. The high-speed engine has been developed to such a point of excellency that it will run day after day without receiving much more care than its heavier brother. Persons who have had trouble with this type did not procure good ones, and here is where the joker lies—there are few really good high-speed engines on the market, and these are very high priced. It takes time and money to develop one of this type, and few firms have been able to afford the necessary experimental work. It is unnecessary to state here what these problems are, it is sufficient to add that they have been surmounted in a number of cases, and one of these engines correctly installed will be perfectly satisfactory in any cruiser. At the same time an engine of this type should always turn over at a good rate of speed, and if the speed of the boat is such that the propeller ought to be geared down, you have the complication and expense of a gear box. Also one must understand that any engine of this type is very sensitive, and needs more intelligent care than a slower-moving machine. In my opinion there is no excuse for putting a high-speed engine in a cruiser that is only intended to make 10 to 12 miles per hour, with the possible exception that room is very much at a premium.

J. APPELTON, Port Washington, Wis.

The Fuel Problem Solved

(Continued from page 25)

batteries, coils, magnetos, wiring, etc.

The fourth difference is in the working or expansion stroke. In the Diesel engine, the pressure on the piston during the working stroke, due to combustion, continues through that part of the stroke during which fuel is introduced, while in conventional types, all the fuel necessary for a charge being present in the cylinder at the moment of ignition, the propagation of flame is intensely rapid and the resultant expansion resembles an explosion or hammer blow.

Now, a comparison of the Hvid with the Diesel type of engine can best be made by describing the cycle or rather the sequence of events which makes up the cycle of each.

(Continued on page 58)

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ATHOL MFG. CO.
71 Chestnut Hill Avenue ATHOL, MASS.

(Continued from page 56)

The Diesel engine operates as follows:
First—Draws into the cylinder a charge of pure air at or near atmospheric pressure and temperature.

Second—Compresses this air to between 410 and 510 pounds per square inch, which raises its temperature to between 1,000 and 1,100 degrees F.

Third—Injects a small quantity of fuel by means of air compressed to approximately 800 pounds per square inch, and then cooled. The fine spray formed by the mixture of this compressed air and the fuel as it passes into the cylinder through the injecting valve, on coming in contact with the red-hot compressed air in the cylinder, spontaneously ignites and combustion takes place at practically constant pressure throughout that part of the working stroke during which the oil is continuously forced into the cylinder.

Fourth—Exhausts the burnt gases.

The cycle then is repeated.

The Hvid engine operates as follows:

First—Draws a charge of pure air into the cylinder at or near atmospheric pressure and temperature. During part of this suction stroke, fuel is admitted by gravity through a mechanically operated valve, into a small steel cup, the inside of which is connected with the main cylinder by two small pin holes, which are located at the bottom of the cup and point towards the piston. The amount of oil admitted is controlled by the governor by means of a needle valve.

Second—Compresses the pure air in the cylinder to between 400 and 500 pounds per square inch, which gives rise to temperatures of from 950 degrees to 1,050 degrees F.

Third—As the temperature of the air in the cylinder rises, due to compression, so does the temperature of the small amount of air which is in the steel cup, since the cup is connected by the two small pin holes with the main cylinder. There ensues then, within the cup, an ignition and combustion of very small amount of the oil previously admitted to the cup (the amount of oil consumed by this preliminary or primary combustion within the cup must necessarily be infinitely small because there is not sufficient air in the cup to support the combustion of more than a minute amount.) As this combustion takes place, the pressure within the cup rises above that in the combustion chamber and drives the surplus oil out through the two pin holes in a heated spray, which, on coming in contact with the hot compressed air in the cylinder, ignites and burns at approximately uniform pressure.

Fourth—Exhausts the products of combustion.

The cycle is then repeated.

In the light of the recent performances of some of the German submarines, notably those of the U-53 and the merchant submarine Deutschland, the attention of naval engineers all over the world has been turned with renewed interest to the Diesel type of motor, which made these performances possible. Wonderful as the reliability and fuel economy of the Diesel engine is, Hvid's type bids fair to far outclass the former, owing to its extreme simplicity and ease of starting, as well as its wonderful fuel economy. As far as fuel economy is concerned, let us cite a recent test of a three-cylinder Hvid type engine made in Lansing, Mich. The same size of engine operating as a conventional type of gasoline engine, was formerly rated at 60 h.p., with a maximum output of 70 h.p., but when converted into a Hvid type, it showed a maximum output of 87 h.p. (a gain of nearly 25 per cent.), and was re-rated at 75 h.p. The fuel consumption during this test was .42 of a pint per horsepower, using fuel oil for fuel. This is a wonderful record. Another great point of advantage which the Hvid type of motor has over the Diesel is that it can be built in small units (as small as 1 h.p.), which is out of the question with the Diesel type, owing to the complications of the air compressors necessary for fuel injection.

Yard and Shop

(Continued from page 39)

in groups and with attractive decorative backgrounds. The names of the boats are given with their owners, and concise descriptions of the hulls and power plants are in most cases included. In announcing "The Boat Book" to its present and prospective customers, the Van Blerck company states that its intention has been to give a general idea of the vastly different types of craft for which Van Blerck motors are suited, and not to present the actual specifications of any Van Blerck motor. If details are desired, they may be found in the "Van Blerck Book of Facts" which, in its way, is fully as attractive a booklet as "The Boat Book." We wish to congratulate the Van Blerck company on the truly excellent quality of its publications.

Price Changes on Universal Motors

Becoming effective on the first of the year, the Universal Motor Co., of Oshkosh, Wis., has found it necessary to advance its prices on Universal motors and electric generating sets. Future dating on shipments up to May 1, however, may be had under the old terms by those who were so handed enough to get in their orders before January 1.

New Motors Promised

The Lacy Marine Motor Co., of Rochester, N. Y., recently incorporated under the laws of New York State, will specialize in the production of high-speed, light-weight motors for marine use. Designs for these motors, which will be suitable for express cruiser and runabout use, have been drawn up, and it is promised that at least one size will be on exhibition at the coming motor boat show, while deliveries will commence early in the spring. Lacy is not a new name in the marine field by any means, as it will be found among the charter members of the National Association of Engine & Boat Manufacturers, while V. E. Lacy has been designing motors for nearly two decades. His name has been connected with the production of high-class motors of marine, stationary and automobile types, and the eight-cylinder V-type machine which he will now offer is declared to reflect greatly to his credit. He is president of the newly formed company, and Frank Lacy is secretary and will look after the sales.

New Bosch Contracts

The Bosch Magneto Co., of New York, has signed contracts with four prominent concerns in the motor boat field to use Bosch magnetos for the coming season. These are the Buffalo Gasoline Motor Co., of Buffalo, N. Y.; the Fay & Bowen Engine Co., of Geneva, N. Y.; the J. W. Lathrop Co., Inc., of Mystic, Conn., and the Scripps Motor Co., of Detroit, Mich.

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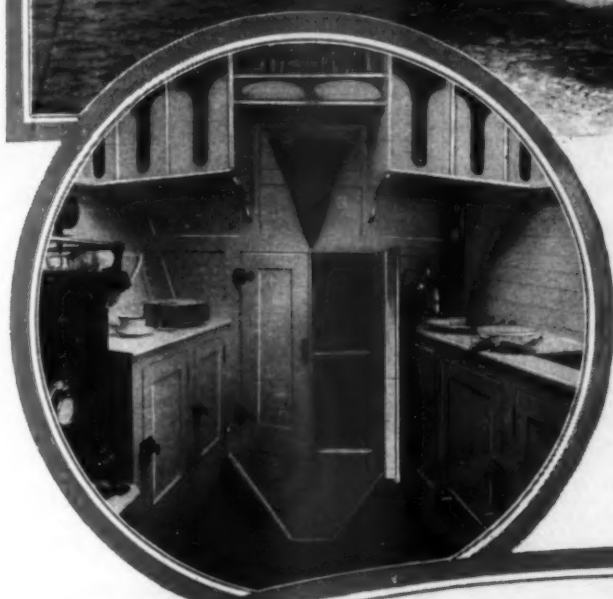
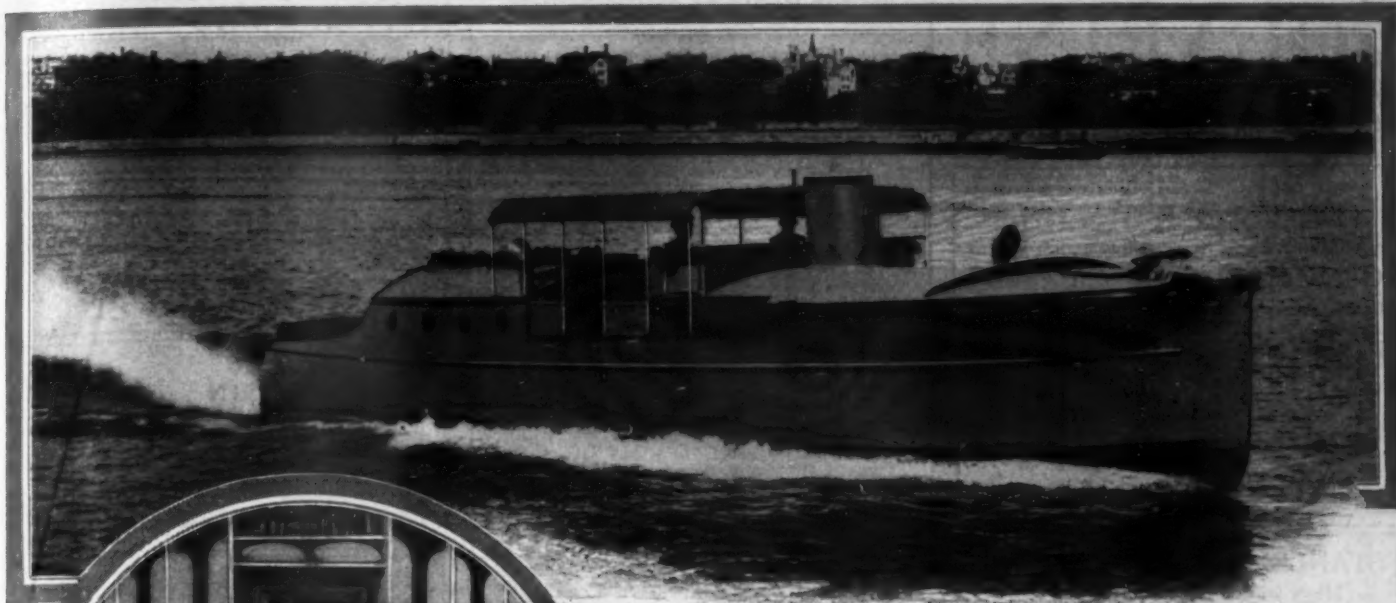
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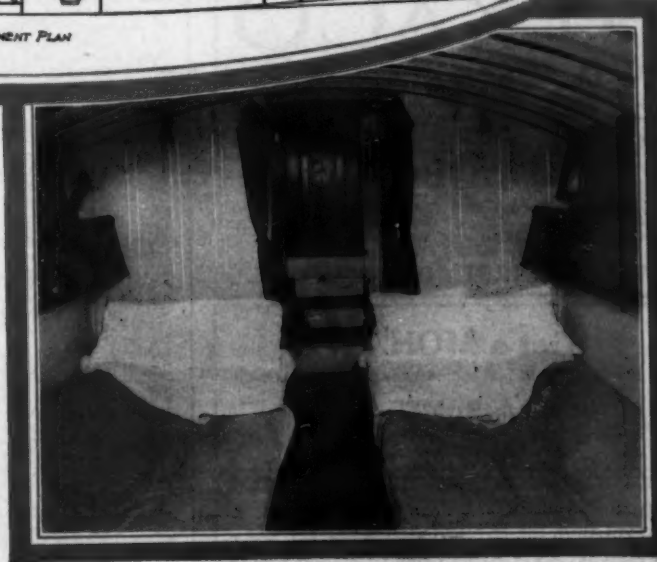
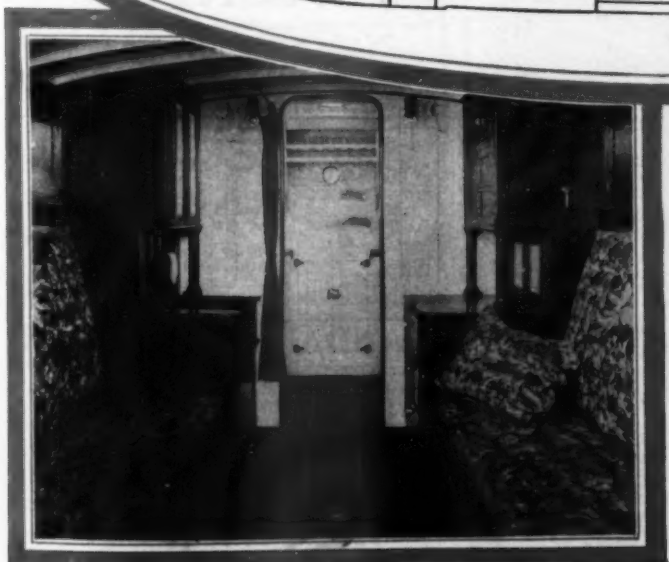
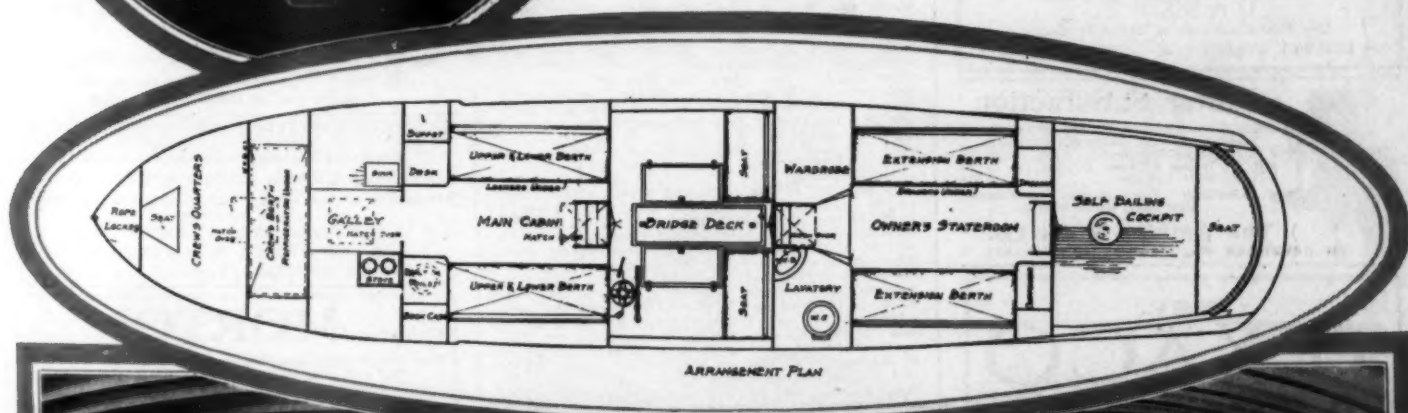
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Motor Boats as Naval Scouts

(Continued from page 8)

having a bar before the entrance. The remedy is the same in either case, and is the one commonly employed by life savers in making a landing; that is, to tow a drag or sea anchor. If without one, any bulky article attached to a stout line may be dropped over the stern and towed. The resistance offered will help materially in checking the tendency to root.

With some boats and in some seas it will be found that the bow is rooting and the stern being boarded by the following waves. This is a bad case. All the movable weight (passengers, for instance) must then be placed amidships to lighten the ends and the boat swung a very little from a fore-and-aft bearing on the seas. If the boat is of the open-cockpit type, canvas should be fastened over the after end of the cockpit. This is a case in which oil might help some, the boat is run slowly and the oil put out from any part of the boat that will cause the slick to be spread by the time it reaches the stern. The burying of the bow and stern of a boat with fine sharp ends is of little consequence, as the lack of bearing surface in such boats makes this a condition to be expected, but the sea has not hold enough on either end to do harm, and the end will rise as quickly as the wave passes by.

BEAM SEA

In a beam sea, conditions are such as to require the utmost attention on the part of the helmsman. The boat is traveling in the trough and if an oncoming sea is a bad one, one must decide instantly whether to run or head into it. The present position of the boat generally governs the maneuver. If the boat has just recovered from a lurch and the bow is too far to windward to give her time to run off, she must of necessity be thrown head in. If she is too far off the wind to give her time to be swung up she must be sent to leeward. Most of the time the shape of the sea is such that the boat can be held to the course; this gives the helmsman the choice of the maneuver.

LEE SHORE

When running along a lee shore for any considerable distance the scend of the sea will steadily set the boat toward the beach. There is seldom a sea so heavy that there are no smooth, well-rounded waves mingled with the rough ones, and in every smooth the boat should be sent on the course as far as she will go. Turn her to windward in the rough seas, and in some of the smooth ones if necessary, but in no case let her fall to leeward.

During a blow a boat should pass to the lee side of islands and shoals where it is possible to do so; no shoal is so deep that it has no influence in smoothing the sea. A shoal near the surface will stop the waves altogether and leave only the wind for the boat to contend with.

FOG

If caught in a fog without a compass or with the compass out of order, the best way in which to prevent a boat from losing her direction is to take guidance from the run of the waves. Thus, if the waves were coming toward the starboard bow when the fog set in, they should be kept coming from the same quarter.

By training a line over the stern one may keep running straight ahead, and not in a circle as is often done. The longer the line the better, as with one of good length, any swerving from a straight course will show at once. Verification of the steering in a fog or rain may be gained by watching the slant of rain drops or drizzle.

REFLECTIONS OF ROCK AND SAND

A majority of the rocks and shoals within range of the cruising motor boat are usually unmarked by buoys of any kind, but most of such obstructions betray their presence by reflecting their colors to the surface of the waters immediately surrounding them. The shade, or density, of the color will vary with the different phases of the day, from clear distinctiveness to an indefinite something yet to be practiced eye the hues may be distinguished and used with advantage. It well repays the operator of a motor boat to cultivate the faculty of observing the different shades of the water, as it gives a confidence in running that adds to the comfort and interest, and in combination with a judicious use of the lead-line, enables him to pick his way with a degree of certainty into harbors and inlets that are new to him. This applies more particularly to fairly clear waters and not such as are found in or close to the harbors of large cities. A mud bottom is not so good as a sand or rock bottom, but even over mud there will be different shades of color in the shallows and the channels.

When running in open waters, a faint line may appear at some distance ahead and commence to loom. On a near approach the entrance to a small harbor or inlet may be looked for, though the coast at first appears to be one unbroken line. As the boat draws nearer dark spots of brown may be seen at some places, while at others grayish or white shadows prevail; the former indicates deep and the latter shallow water. When approaching to four or five hundred feet, close observation will possibly show water of a decided greenish tint and water having a certain placid or slick whitish appearance. The latter color should be avoided and the deeper green followed, and then with a good lookout in the bow it will be perfectly safe to proceed slowly into the place as far as it is desired. The higher up the lookout is placed, the better he will see the bottom and select the route to be taken.

The entrance to an all-sand harbor over a bar may be made by observing the difference in color when arriving at the 18-foot depth, for the break is clearly visible. When passing into the 12-foot depth, it will be well to slow down to half speed. Here the darker green veins of water should be chosen. They will be seen narrowing from all sides to two or three dark-green streaks. This phenomenon might be more understandingly expressed by saying that large light-green patches will be seen ahead, which vary in shade almost to white, and that between these patches will be seen darker green leads in the water. The latter may run through the center, or away off to one side, but wherever they are they should be followed, as they indicate channels. Generally they lead to one main channel that runs into the deeper body of water to be found within.

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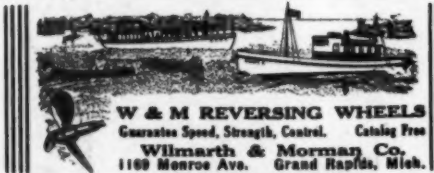
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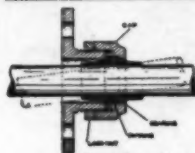
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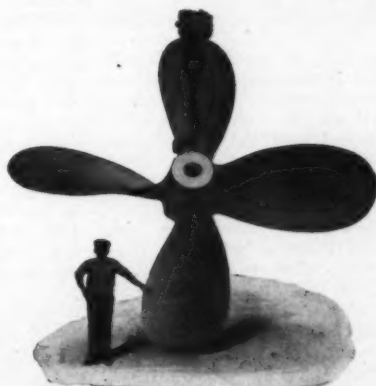


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AMONG THE CLUBS

M. R. Y. C. Plays Santa Claus

Out in Toledo, O., where the Maumee River flows and where the yacht club of that name makes its headquarters, someone—it may have been the retiring commodore, Percy Jones (retiring is good), or the steward, or the chairman of the subcommittee of the house committee or someone else—discovered that the wave of prosperity which has deluged the country had overlooked some folks. Or if it hadn't overlooked them, it had trickled up the back alleys and succeeded only in dampening and chilling the well-known Christmas joy. As a result of this discovery, a Christmas dinner of 400 plates was arranged for an equal number of youngsters who knew Santa Claus only by hearsay or by his commercial imitators in the show windows of exclusive stores. An appeal went forth; every member was invited to contribute; a dozen or so of the more-or-less-trusted men of the Maumee River Y. C. were appointed receivers of the contributions, and no member was forbidden from multiplying his donation by twelve, dividing it by twice six, and sending an equal part to each of the dozen or so. Such an ingeniously artless and artfully ingenious appeal as this was could hardly be denied, and the returns almost swamped the financial reception committee. Their state of mind could have been compared to that of the Republican National Committee before barometric disturbances set in and a cold wave was predicted from the West.

Wherefore, the dinner on Christmas day was a continuous performance of mastication, deglutition and satisfaction. The kids may not have called it by just those words, but when it was all over they knew that they had eaten more, individually and collectively, than it is possible for a youngster or group of youngsters to eat. If any one of them voiced a sorrow it emanated from a sad reflection upon the extreme singularity of Christmas in any given calendar year.

We hinted above at the retirement of Commodore Percy Jones. It is true—after years at the helm he is assuming the role of ordinary citizen, although the other club members will never think of him as just that. To celebrate the occasion (or mourn their loss) the club members will give a dinner on January 9, of which the Commodore will be the host. We aren't quite sure from the information in hand whether, or not he will stand treat, but anyway he will be host and the other members guests. At this soul-stirring banquet the new officers will be appointed, and after that it will be a regular, joyful, get-together jamboree, with all the fixings. We wish we could be there. We have the invitation, but nobody thought to send mileage.

Nyack Boat Club Elects

At the annual meeting of the Nyack Boat Club, of Nyack, N. Y., the following officers were elected for the ensuing year: Dr. H. E. Crocker, commodore; Robert Clark, vice-commodore; Dr. Bradley, rear commodore; W. F. Crosby, secretary; John Cantwell, financial secretary, and Warren Hill, treasurer. The club is reported as being in fine condition, with a membership of nearly 200.

Election Ticket of N. R. Y. C.

The New Rochelle Yacht Club, of New Rochelle, N. Y., has posted the report of its nominating committee, composed of R. B. Stoddard, C. A. McGill and A. H. Titus, to the club's board of trustees. The following nominees for officers, trustees, committees and measurer will be voted on at the annual meeting in February: For commodore, Charles A. Marsland, owner of the yacht *Guardia*; for vice-commodore, Henry W. Martin, owner of *Enid II*; for rear commodore, George P.

Granberry, owner of *Anita*; for secretary, William J. Winter; for treasurer, Henry M. Lloyd; for trustees, C. E. Whyard, Francis M. Wilson and Samuel J. Garges; for the regatta committee, Edwin H. Tucker, Oscar H. Chellborg and William H. J. Ehler; for the entertainment committee, Charles L. McLeod and Eugene A. Manning; for the nominating committee, Augustus P. Bennett, James L. Givan and Albert E. Sheridan; and for measurer, Roger M. Haddock.

Annual Election of Hudson Park Y. C.

The annual election of officers for the Hudson Park Yacht Club, of New Rochelle, N. Y., took place on December 5, the following being elected: William F. Sultz, commodore; Hugh E. Harris, vice-commodore; E. B. Lapham, rear commodore; C. S. Roberts, treasurer; George Neumann, secretary, and John Farley, fleet captain. After the election the club held its annual banquet at the Hotel Lafayette, covers being laid for sixty members. The Hudson Park Y. C. is one of the younger clubs on Long Island Sound, and the close of the year 1916 found it in a healthy, prosperous condition.

Sheepshead Bay Y. C. Entertains

On Sunday afternoon, December 10, the officers and members of the Sheepshead Bay Yacht Club gathered in the new clubhouse for social doings. The assembled members took pleasure in reviewing among themselves the growth and progress of their club during the past year. The club has pursued a uniform policy of expansion, and in addition to an increase in membership has secured a commodious new clubhouse situated on Emmons Ave., Sheepshead Bay. When alterations are completed, this house, it is said, will be one of the finest in Greater New York. It stands on the water's edge and has fine lawns and an unobstructed view. The coming yachting season will be one of much social as well as nautical activity.

Officers of Aero Club Re-elected

At the annual meeting of the Aero Club of America the club elections resulted in unanimously electing for another term the same administration which has so successfully managed the affairs of the club for the last two years. These officers are: Alan R. Hawley, president; Henry A. Wise Wood, first vice-president; Cortlandt F. Bishop, second vice-president; Charles Jerome Edwards, third vice-president; Godfrey L. Cabot, fourth vice-president, and Charles Elliott Warren, treasurer. Alexander Graham Bell, for his contribution to the development of aeronautics since 1907, was elected honorary member. The report of the chairman of the membership committee showed that at the time of the election there were 780 members, of whom 291 were admitted to membership last year. The club has issued 676 pilot certificates, of which 295 were given out in 1916. The Aero Club is carrying on with more vigor than ever its praiseworthy efforts to enlist Congress and public sympathy in the cause of adequate aerial defense for our country.

American Model Club Meets

The 350th meeting of the American Model Club was held at the clubhouse at the foot of 60th St., South Brooklyn, N. Y., on December 3. A smoker took place after the meeting in celebration of the event. The following men were elected to office for the ensuing year: E. A. Plunkett, commodore; W. F. Coyle, vice-commodore; J. C. Collins, fleet captain; P. M. O'Neill, secretary; F. J. Townsend, financial secretary; E. H. Wirth, treasurer; P. H. Bell, measurer, and G. F.

Winchell, C. R. Donnell and J. D. Casey, trustees.

Chicago M. B. C. Holds Elections

The following officers were recently elected for 1917 by the Chicago Motor Boat Club: A. H. Webb, commodore; W. A. Woods, vice-commodore; N. C. M. Jensen, rear commodore; Leo P. Plantin, secretary; Gust. Weideman, treasurer; and W. W. Nugent, P. Kargard, Ralph Esau, G. E. Reid and Oliver Stenstrom, trustees.

Syracuse Stirs

For a long time Syracuse, N. Y., has been lacking something, and that something was a good live boat club. The need has been made doubly imperative now that the Barge Canal is approaching completion, for when it is open the city will have some of the finest motor boating in the country, with accessible waterways to the finger lakes of the state as well as to Lake Ontario and the Thousand Islands.

A group of twenty-three charter members has risen to the occasion and formed the Onondaga Motor Boat Club, whose first meeting was held a month or so ago. At that time it was determined to erect a suitable breakwater and housing quarters on the Liverpool shore of Onondaga Lake. The club's constitution will be adopted and the club will be incorporated as soon as possible. Given enthusiasm and the right spirit, the club is bound to succeed.

New Officers of Sheepshead Bay Y. C.

The following officers have been elected by the Sheepshead Bay Yacht Club for the ensuing year: Commodore, J. E. Schiffmacher; vice-commodore, J. B. Adams; rear commodore, L. W. Seeligsberg; secretary, A. A. Scharbus; and treasurer, J. T. deMott.

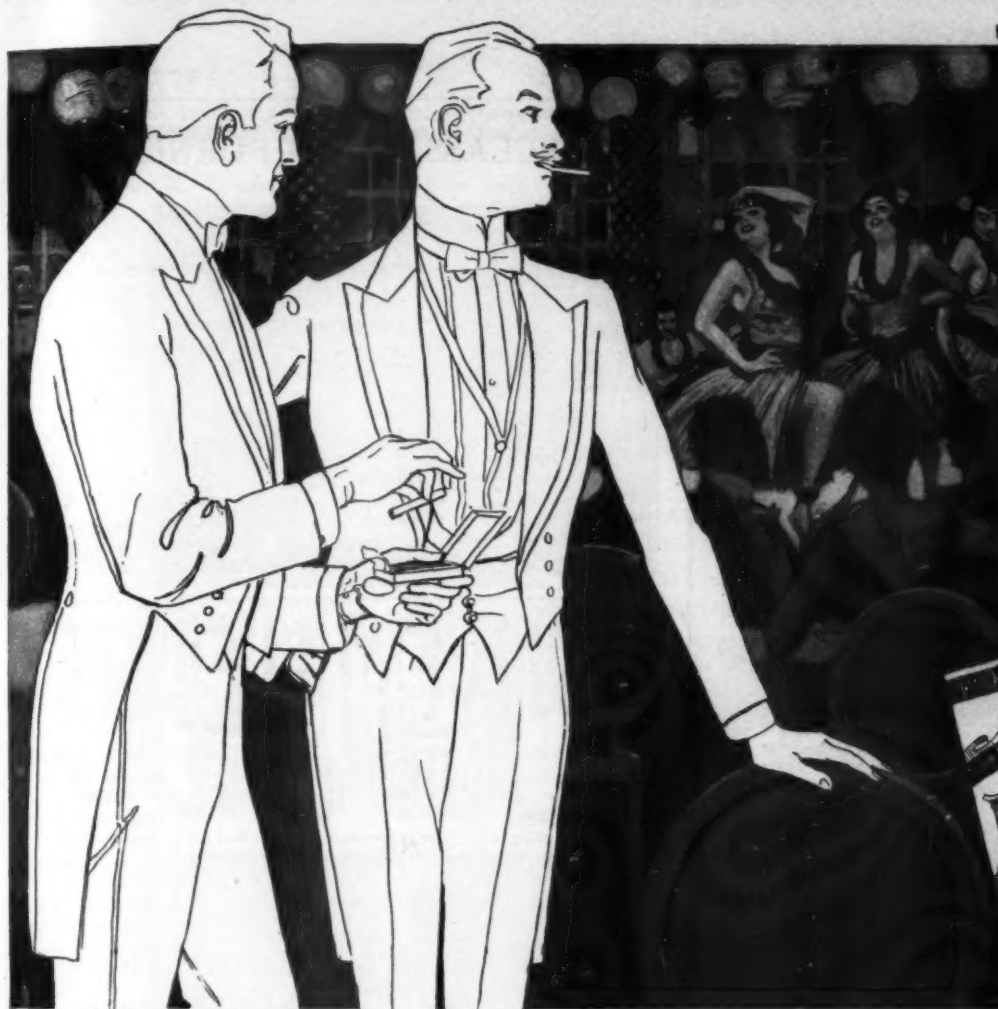
South Shore P. B. C. Elects

At the annual election of the South Shore Power Boat Club, of Chicago, Ill., the following were elected to serve in 1917: E. E. Fies, commodore; R. M. Baker, vice-commodore; C. A. Cann, rear commodore; C. C. Fauquier, secretary; John Swanson, treasurer, and L. J. Flood, E. L. Bauer and George A. Jeffers, directors.

New Club in California

The South West Yacht Club, of San Diego, Cal., was organized on November 19, with a charter membership of twenty-nine. Headquarters of the new club are located at the foot of Grape St., on the reclaimed tide lands of the city, where a suitable wharf and landing floats extending out to deep water have been built. Ample mooring ground near the north end of San Diego's landlocked bay, between Dutch Flats (which has just been ceded to the United States Government for a naval training station) and the new city bulkhead, affords a safe and convenient anchorage for the club fleet and visitors.

A suitable constitution and by-laws were adopted and the officers elected were: Commodore, A. N. Loring; vice-commodore, C. S. Webber; rear commodore, J. C. Hobson; secretary, F. F. Vance; port captain, William Neill, and assistant port captain, S. Chamblin. The club flag consists of a two-pointed burgee with a blue field and a diamond-shaped center, reaching from the top to the bottom, of red, the letters S W in white being perpendicularly arranged on the red diamond. It is expected that the advent of the South West Yacht Club will greatly stimulate interest in yachting, motor boating and aquatic sports in San Diego, where the boating season lasts the entire year round.



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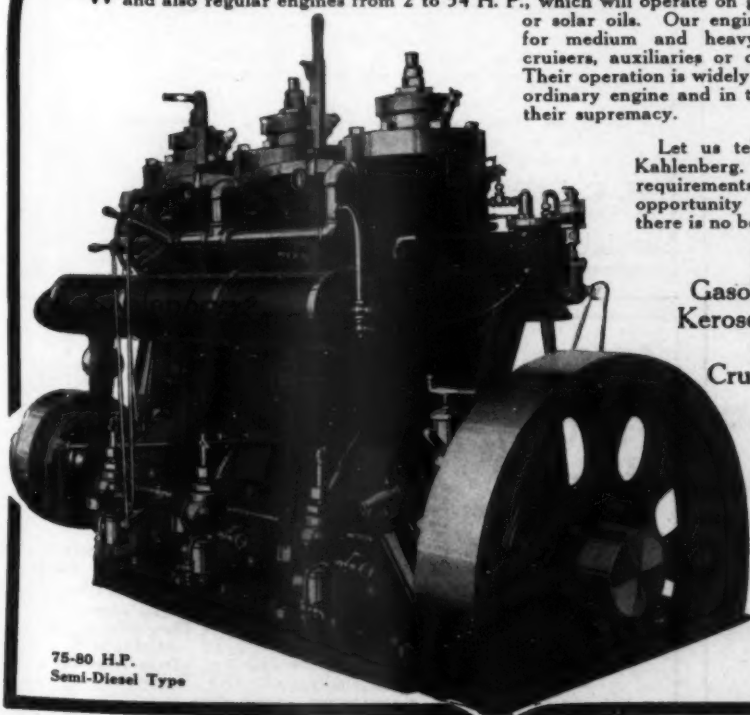
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Very truly,

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Per Howard C. Morgan.

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Simple, Certain, Serviceable. Built for the hard, continuous work for which most marine motors are used.

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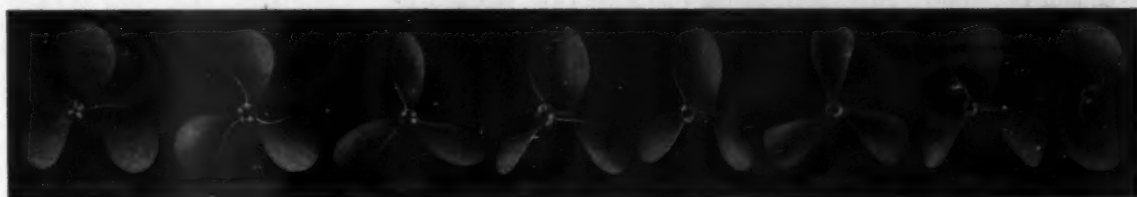
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504,000 PROPELLER REVOLUTIONS IN SIX HOURS

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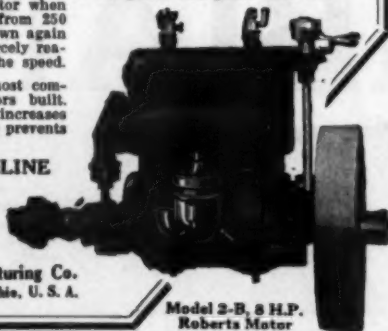
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1-2-3-4-6 Cylinders
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Roberts Motor

CHEAPEST POWER

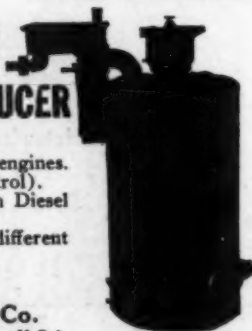
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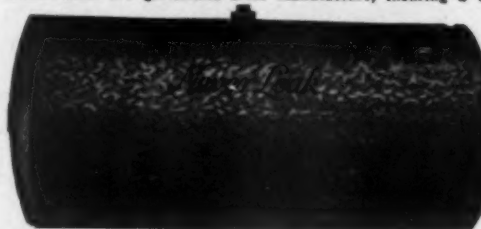


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A good engine that is cheap to run is far more satisfactory (and less expensive in the end) than a cheap engine that costs a lot to run.

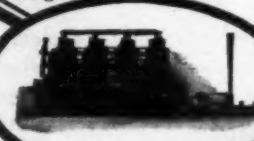
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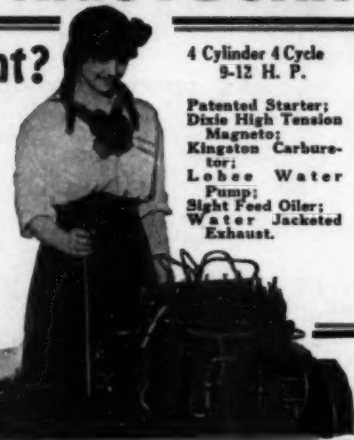
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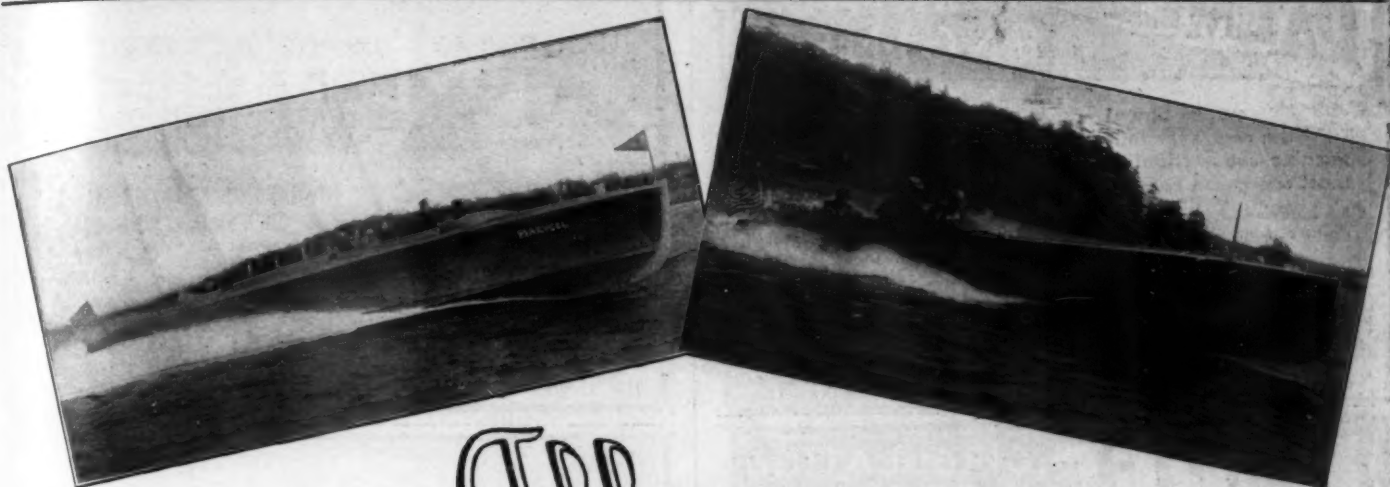
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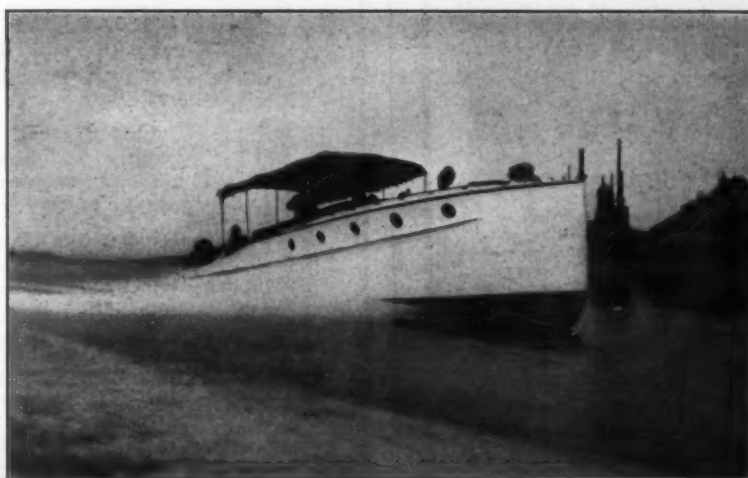
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ARE YOU GETTING full speed and power out of your motorboat? Or does it "stall"—back-fire and sometimes refuse to start? These are all symptoms of "Black Plague"—carbon. You can remedy 80% of your engine trouble if you will clean your cylinders with

JOHNSON'S CARBON REMOVER

This is the latest and most perfect solution of the carbon trouble. It is easy to use—inexpensive and absolutely harmless. It will save you ten times its cost every time you use it.

DO IT YOURSELF

Five minutes' time and no labor required. Simply pour an ounce or two of Johnson's Carbon Remover into each cylinder through the petcocks or spark plug openings. Go about your other affairs for from three to twelve hours—then start your engine. The bulk of the carbon will immediately blow out and the balance will come out for the next twenty-five or fifty miles—until the engine is as clean and sweet as it was when new.

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Johnson's Carbon Remover is splendid for gasoline engines of all kinds—automobiles, motorcycles, stationary engines, etc. Also fine for cleaning spark plugs. Johnson's Carbon Remover cures 80% of engine troubles.

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OUR GUARANTEE

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SPECIAL OFFER

We will send you by prepaid express for \$1.00 (bill or stamps) enough Johnson's Guaranteed Carbon Remover to thoroughly clean an ordinary four-cylinder motor three times.

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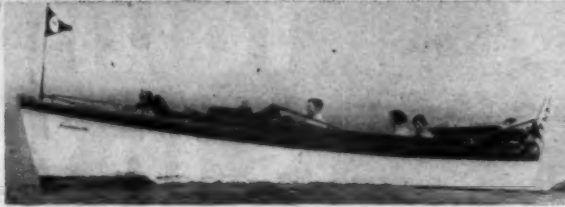
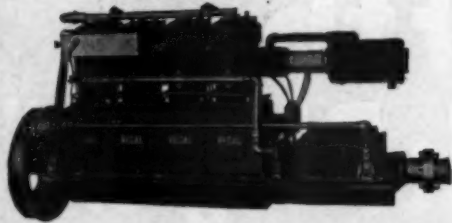
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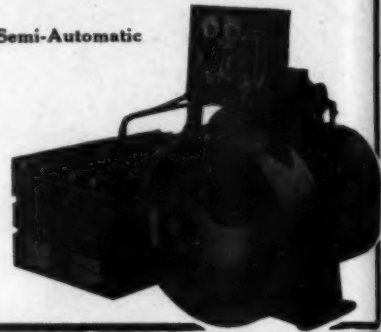
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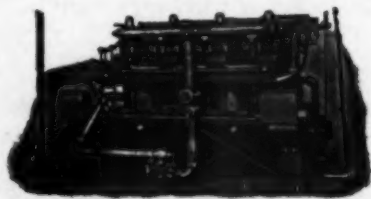


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Latest V-bottom design—fast, dry and comfortable. Sturdily built and handsomely finished. The kind of a boat you want to own, at the price you want to pay. Early deliveries.

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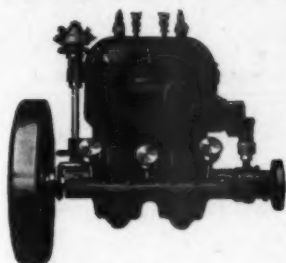
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Start This Year Right—Build for the Future

OUR 18th ANNUAL ANNOUNCEMENT

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The Model 2K Eagle Marine Engine

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We have a large line to choose from and offer a delivery service that will be a surprise to you.

Every indication points to 1917 as the greatest Boat Building Year in our history. The demand for Engines will be enormous, the difficulties in manufacturing due to conditions existing in the raw material market will result in advanced prices. We urge our customers to place their orders early.

It appears almost useless for us after 18 years of continuous national advertising and with a business record unsurpassed, to place our merits before you for consideration at this time, nevertheless there are a few of the better class dealers that we feel should be associated with us and selling the most complete and up-to-date line of 2-cycle engines on the market.

The EAGLE is the popular priced line with excess power and excess value. You never did, and never will, purchase better value for your money than that offered you in every "EAGLE" ENGINE.

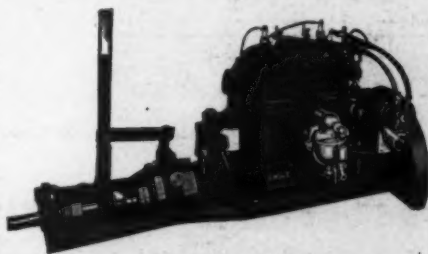
Therefore, we address ourselves to the live dealer, to the dealer who has an established business, who is sufficiently alert to grasp the importance of representing an established popular line and who realizes the importance and value of an association with an established house.

We want you to know that we are building our business on large lines. We insist on your receiving the best Engines at attractive prices; we insist that you get engines when they are wanted.

Yes, we are one of the pioneers in the marine engine field. "Eagle" engines have a record of making good and they are better to-day than ever. The more you have us build, the cheaper we can build them, and the less you will be obliged to pay.

Mr. Dealer and Mr. Builder, we want you to realize the importance of selling a quality engine. Stop working in a circle, have a purpose. Business without a purpose is "like a ship without a rudder." It's up to you to make good or you make way for the other fellow. Don't be "penny-wise and pound foolish." It's a penny-wise policy to sell questionable engines when you can sell one with a world-wide reputation. Associate yourself with a live organization. Handle "Eagles." Talk "Eagles," and you will appreciate the importance of what we are attempting to impress upon you.

Start the year 1917 right; build your business for the future. There is no profit for you if you are obliged to change your sources of supply on engines each year. Our most desirable and prosperous dealers are those who have sold Eagle Engines for periods of six to twelve years. They have made money in following this policy and we see no reason why any live and enthusiastic dealer or builder cannot do the same.



The Model 2 "O" Eagle Marine Engine
Unit Power Plant

This engine holds the world's record for speed. Running at 1,300 R.P.M. (at which speed all are tested), it develops 17½ actual H.P., making it the most desirable engine for propelling boats from 16 to 25 feet in length ever designed.

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Torrington, Conn., U. S. A.

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RIDES THE SEA LIKE A DUCK BUT NEVER DIVES



20 ft. Special Dory Launch
Safest Little Family
Boat Built
Will Stand the Ocean Waters

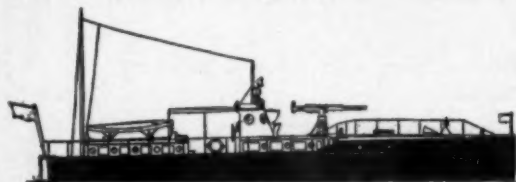
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17' Launch Harbor Boat
14' Far Outboard Motor
18' Shallow Draft
12' Rowing Skiff
16' Painted Tender
16' Varnished Tender
17' Club Sailing Dory
24' Cabin Cruiser
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"See us at the Show"



CAPE COD POWER DORY CO. 455 MAIN ST., WAREHAM, MASS.



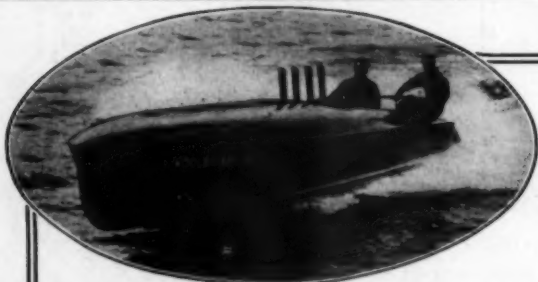
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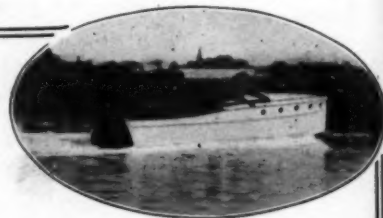
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Fast, safe and seaworthy.

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16, 18, 21 and 25 footers, knock down
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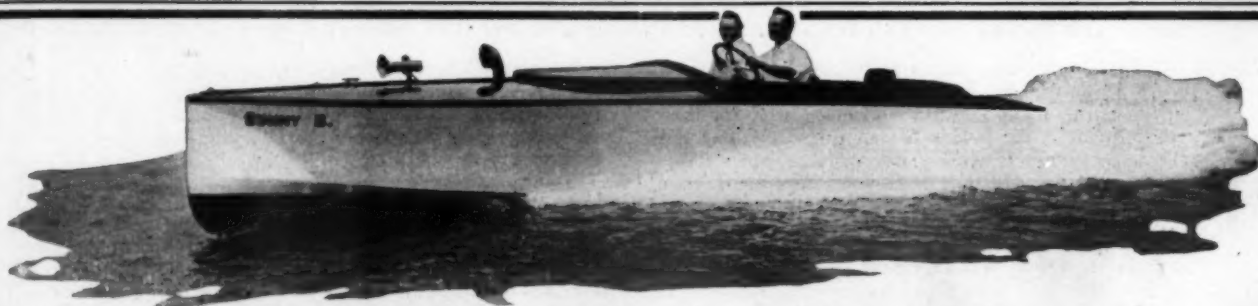
I am building under my own personal supervision a number of up-to-the-minute runabouts with speeds up to 40 miles an hour. Latest type of refined construction, safe and comfortable family boats, with speeds guaranteed.

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You can have a real Quality boat and still save from 10% to 40% if you buy your boat from us. Valley boats are Quality boats—up to the minute in design and having the finest of materials and workmanship.

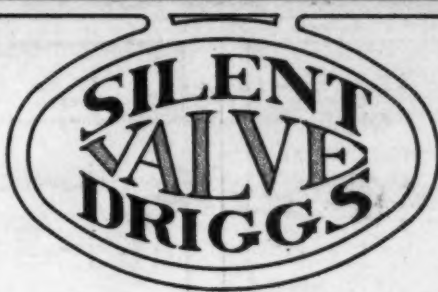
We will sell you the complete finished boat, with or without power, or merely the frame, planking, planked hull, decking or whichever parts you want. Our stock designs are from some of the most prominent naval architects in the country.

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The SILENT VALVE—DRIGGS Marine Engines mark another step forward in Marine Engine design.

These engines incorporate the Russell Rotary Valve. The many advantages of rotary valves over poppet valves have long been recognized. The failures of previous types of rotary valves were due to the fact that no adequate means had been provided for making adjustments necessitated by temperature changes and wear.

The adjusting mechanism of the Silent Valve is simple, accurate and positive, insuring at all times a tight, noiseless valve.

The following are the main points of superiority of SILENT VALVE construction.

1. SILENT VALVES make possible the use of large unrestricted ports. This leads to increased volumetric efficiency and fuel economy.
2. SILENT VALVES are **always** silent. The clatter due to poppet valves is eliminated.
3. SILENT VALVE construction is simple. One SILENT VALVE does the work of four poppet valves, and controls the inlet and exhaust for two cylinders.
4. SILENT VALVES are absolutely gas-tight, and **never** need grinding.

DRIGGS ORDNANCE CO., Inc.

120 BROADWAY

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MARBLEHEAD
ANTI-FOULING
GREEN
BOTTOM PAINT

FOR STEEL
OR
WOOD
STAYS CLEAN



IN WARM AND TROPICAL WATERS
you must have
MARBLEHEAD ANTI-FOULING GREEN
it is now
ALL PUT UP DOUBLE STRENGTH

It is a powerful preventive of Barnacles and Marine Growth—the only substitute for copper sheathing as a protection against Tereidos. It preserves the wood and it has a hard, slippery finish which stays clean a long time. Each successive coat of our paint applied each year adds to its power, keeps the underbody smooth and slippery and saves expensive scraping and repainting work.

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A dandy installation for small boats and launches.

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2 CYLINDERS
NO VIBRATION

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246 Barclay Street
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"The Gear That Will Hold Any Engine"

We have proved that there is a big market for a marine reverse gear that is made of the best gear steels, machined in the most careful manner, strong, light, quiet, compact and durable, and enclosed in a neat oil-tight case. Incidentally that is an exact description of the Standard Reverse Gear.

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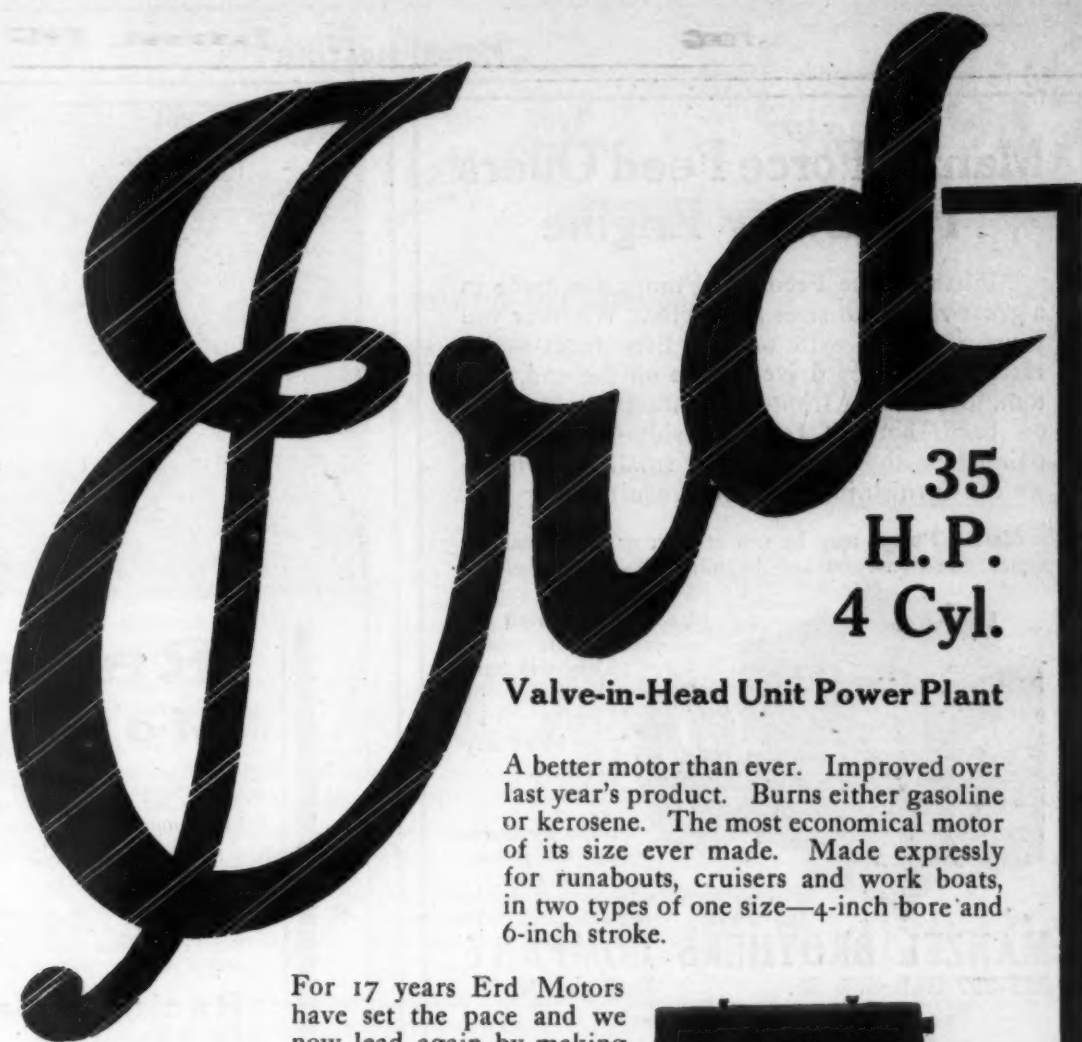
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Built in four sizes, for transmitting from 1 H.P. per 100 R.P.M. to 225 H.P. for 1500 R.P.M. Iron or aluminum case.

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**You Can
Save \$150
to \$225 by
Deciding
to Equip
Your Boat
with an**



**35
H.P.
4 Cyl.**

Valve-in-Head Unit Power Plant

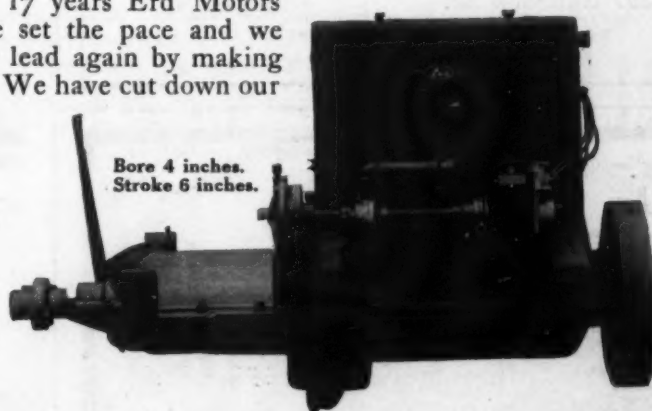
A better motor than ever. Improved over last year's product. Burns either gasoline or kerosene. The most economical motor of its size ever made. Made expressly for runabouts, cruisers and work boats, in two types of one size—4-inch bore and 6-inch stroke.

For 17 years Erd Motors have set the pace and we now lead again by making

a price that no competitors can afford to meet. production costs by building a bigger factory, installing more machinery, and increasing our output to ten times what it was last year and BY CONFINING OURSELVES TO BUILDING BUT ONE SIZE MOTOR. That's why we can give even more for the money and sell for less than before.

Don't decide on a power plant until you investigate the ERD and get our wonderfully low 1917 prices. You'll be surprised at the big saving.

Remember there is no better motor made than the Erd—regardless of price. Write for literature and be convinced.



Bore 4 inches.
Stroke 6 inches.

ERD MOTOR COMPANY
SAGINAW : (west side) : MICHIGAN



40 H.P. at 1200
R.P.M.
34 H.P. at 1000
R.P.M.
30 H.P. at 900
R.P.M.
Speed, 700 to 1200
R.P.M.

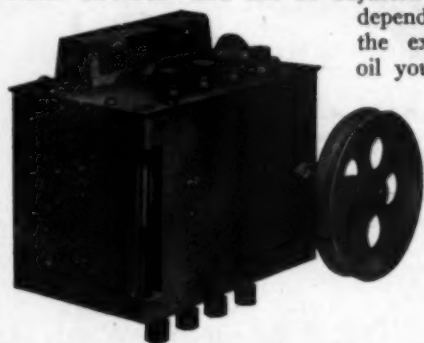
Wanted—Owner-Agents!

We are selling ERD MOTORS this year through owner-agents. We want one live man in each locality to demonstrate the ERD MOTOR in his own boat. We will make you a liberal discount on your own motor and give you a chance to make big money selling your motor boat friends. Write at once for our confidential dealer's proposition.

Manzel Force Feed Oilers For Every Engine

Manzel Force Feed Oil Pumps are made in a great variety of sizes and styles. Whether you want a pump with one or fifty feeds—with ratchet or pulley drive—drive on the end, bottom, top, back or front—with the fastening bolts on back, bottom, front or side—polished or painted finish—with large or small reservoir—we can furnish just what you require.

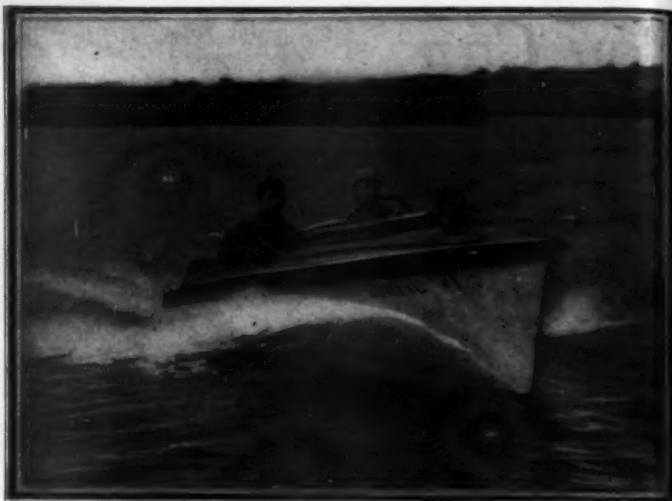
Manzel Pumps may be run at high or low speed—in either direction—and can be adjusted (each feed independently) to supply the exact amount of oil your engine needs.



They will handle heavy or light oil against any pressure.

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and cruisers are used by U. S. Government in Life-Saving and Lighthouse service, by foreign governments, by institutions and individuals everywhere. Racine^{wis} is a name backed by twenty-one years of boat building skill. It means speed, power, comfort, safety and dependability in boats.

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Because it is not easy to distinguish between engine failure and ignition failure—and because many a good engine has been condemned for faults of its ignition—and because dependable ignition counts so much toward engine dependability—the makers of boats, engines, cars and trucks of the better class have standardized on "NORMA"-equipped ignition apparatus. They have found that "NORMA" Bearings protect them against magneto bearing troubles. "NORMA" Bearings identify dependable magnetos—which in turn identify dependable engines.

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BALL, ROLLER, THRUST, COMBINATION BEARINGS

Universal

FOR 1917

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Slow enough for trolling

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A NEW YEAR is dawning to open the gates for a tremendous Universal Business. Nothing succeeds like success—no marine motor has shown such phenomenal all around success as the Universal, no marine business has grown so rapidly.

¶ There's a reason — perhaps it's the untiring efforts of the veteran motor builders, L. J. Monahan and Mr. J. D. Termaat, of T & M fame in the pioneer racing days. The 1917 Universal is their masterpiece.

¶ Attention is also called to the complete Universal factory wherein every part of the motor is manufactured in large quantity to interchangeable exactness.

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¶ The Universal is now the leading small motor, it has been adopted as standard equipment by leading boat builders, in use by U. S. and foreign governments, and being standardized, you can feel that motor satisfaction is yours.

¶ Your boat powered with a Universal might be a 20-mile-an-hour 17-ft. racer, a 22-ft. family boat or 28-ft. cruiser, or it may be a row boat for trolling. In each case you will receive full measure of Universal satisfaction.

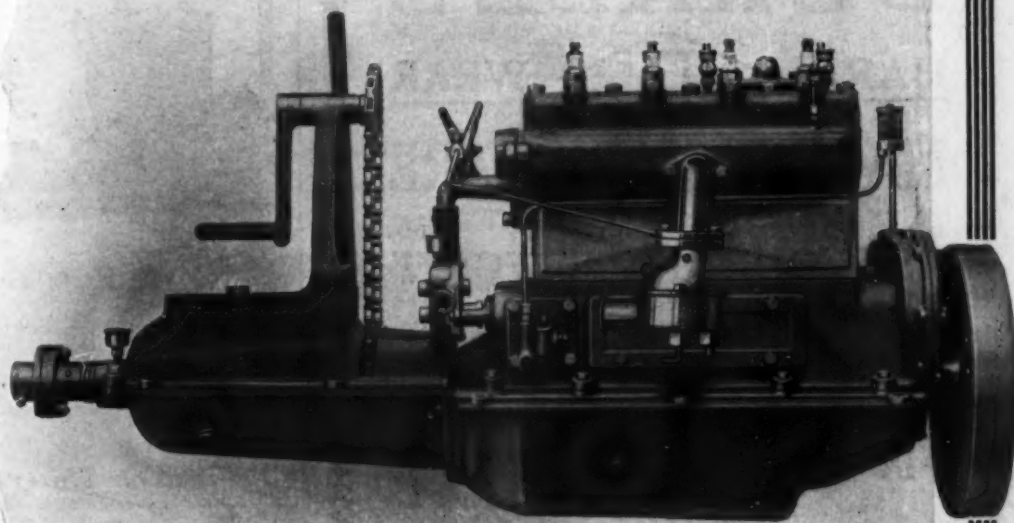
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The Standard
Motor DeLuxe

For boats 14 to
30 ft.

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Oberdorfer Circulating Pumps are used on Loew-Victor, Lockwood-Ash, Morristown, Fairbanks-Morse, Scripps, Erd, Red Wing, Gray, Lamb, Smalley, and other well-known engines. They are preferred for three particular reasons—

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2. Give a positive pressure always.
3. Lift water three feet without priming.

Our type "Z" pumps can be adjusted to relieve when any predetermined pressure is reached. The excess is by-passed within the pump; no return pipe is needed.

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Finished Bronze Bushings

ENGINE MANUFACTURERS

Let us submit samples and quotations on Oberdorfer Bushings. They will save you time, trouble and money. Made of special bronze alloy which is unexcelled in quality and durability.



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HARD  WEAR

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IS THE KIND YOU WANT

ASK YOUR DEALER FOR IT

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MANUFACTURERS OF MARINE HARD-
WARE AND MOTOR BOAT SPECIALTIES

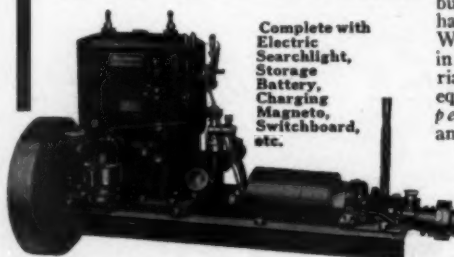
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Northwestern Motors

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Searchlight,
Storage
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Magnet,
Switchboard,
etc.

We will gladly match it in quality, design, materials, workmanship, equipment, price and performance against any motor of its size on the market. Suitable for boats from 20 ft. up.

N. W. Row Boat Moto

A beautiful little engine painted a dark maroon with piano finish, and built throughout to equal the most expensive out-board motors made. The up-to-date ideas we have incorporated in this model will surprise you when we tell you that the price is only.....

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A few days' trial will convince any boat owner that Northwestern Motors are the biggest values in their respective classes. Try one in your boat and use it as hard as you like for 30 days. Your money is as safe as it is in a bank and will be returned to you promptly if the engine doesn't make good.

In addition to quality in design and materials, Northwestern Motors have several exclusive advantages, for instance: Rosholt Patented Gash-Tight Bearings.

Write today for full information about N. W. Motors. Don't spend your good money for any engine until you have this.

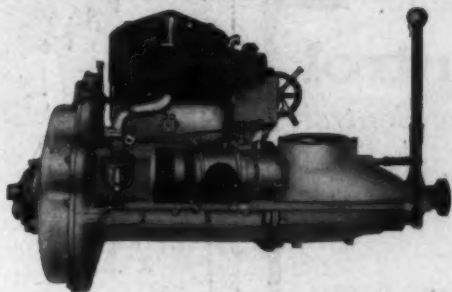
Northwestern Motor Co.
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2 H.P. Out-board	\$50
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4 H.P. Single Cyl.	75
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Scripps

Gasoline
Kerosene
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"MB" 13-15 HP
Other Sizes
10 to 125 HP

The Emergency Engine

Unfaltering dependability in the moment of supreme test has always been a strong SCRIPPS characteristic.

Larsen found it in the Whirlpool Rapids—Day, on the long grind across the Atlantic—Bonnell and Nutting, in the 1,000 mile Ocean dash through the fogs of Fundy.

Again, when the Arctic Explorer, "GREAT BEAR" foundered on Pinnacle Rock, the SCRIPPS equipped life boat lived up to SCRIPPS performance and saved twenty-one lives.

For certainty of service and motor comfort the SCRIPPS is your safest selection. The price is reasonable—in fact, no more than ordinary engines if actual power and equipment are considered.

Above is shown the "MB" 13-15 H.P., a great engine for life-boat, auxiliary, small cruiser, or work boat. Other sizes, 10 to 125-H.P.

Dealers in all principal cities. Consult your Telephone Directory under "Scripps" for local address, or send for new catalog now ready.

SCRIPPS MOTOR CO.

631 Lincoln Avenue

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"Great Bear" on Pinnacle Rock



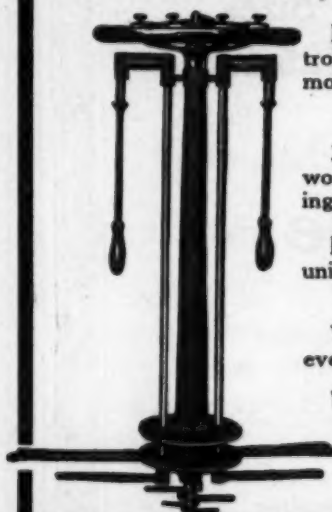
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Twin Unit Control

Perfection in Express Cruiser Control



Makes a strictly one man controlled boat of the twin-screw motor yacht or work boat.

25 other styles for cruisers, work boats, runabouts and racing boats.

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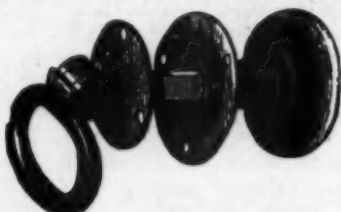
We manufacture a wheel for every type of boat.

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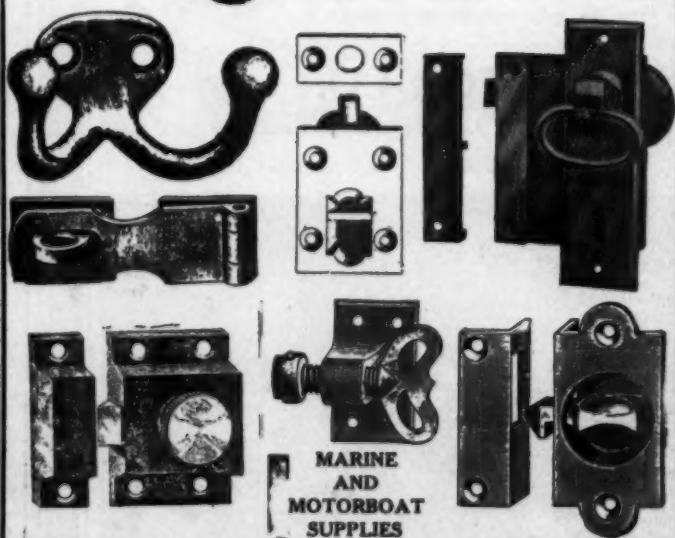
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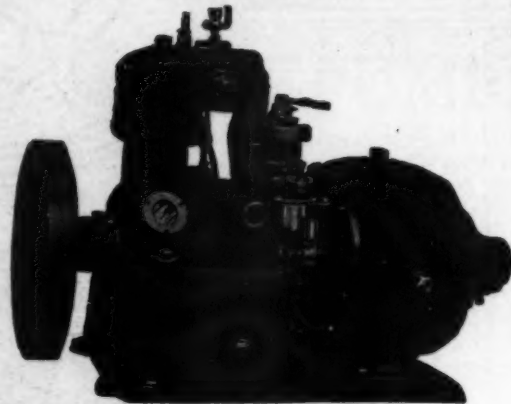


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A HIGHLY developed direct-connected Generator Set. Used on some of the finest yachts built during the past few seasons. Nothing like it in existence, for those wishing a compact and reliable plant, suitable for yachts from 40 to 80 feet, operating interior, running lights, electric fans, search-lights, etc. The air compressor may be used for whistle, air pressure or water tanks, or supplying air pressure for starting engine. Used by U. S. Government on scout cruisers. Send for Bulletin 9000.

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The first cost of Eureka is the only cost. It is automatic and self contained. Requires very little attention.

We have been building magnetos for seventeen years. Our famous Comet Magneto is used for ignition or lights on thousands of power boats.

Magnetos for Ignition and Lights
Direct from \$10.00 Up.

**Lighting Outfits, consisting of Gen-
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Switchboards, \$12.00 and Up.

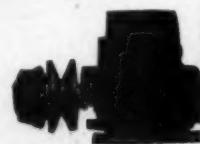
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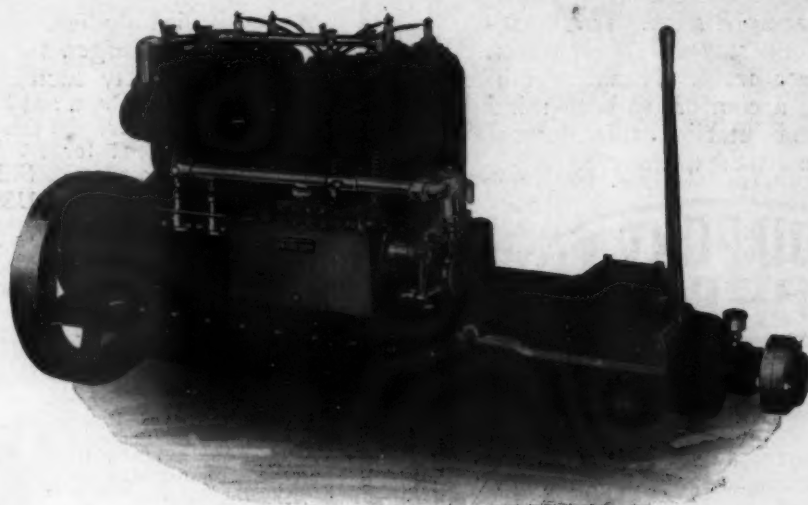
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1917 PRICES

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BUFFALO, N. Y., U. S. A.

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Get our catalog and study Peerless construction and Peerless prices. If you have a friend who owns a Peerless, ask him what he thinks about it. Note the high-grade equipment and accessories we furnish. Investigate the whole Peerless proposition as searchingly as you wish. We will help you.

If your investigation is impartial, we will be satisfied with the result.

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Fabrikoid is the finest kind of a material for boat upholstery. It is handsome, luxurious, staunch. It is water, dirt and grease proof. It makes cushions that are a comfort to both mind and body, and interior cabin decorations that are a treat to the eye.



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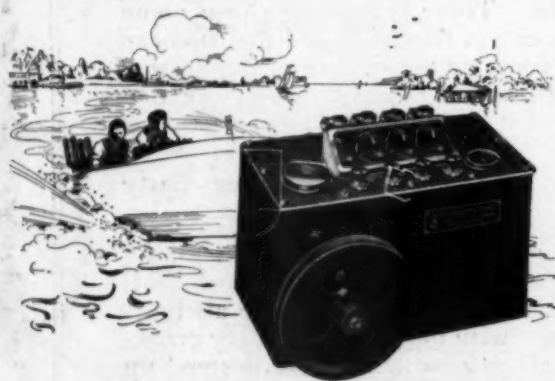
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is light, strong and thoroughly waterproof. Ideal for motor and speed boats. Made in two varieties: Rayntite No. 1 Single texture with Fabrikoid surface, and—Rayntite No. 2 Single texture with Fairfield Rubber surface.

Write for samples and full information.

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Works at Newburgh, N. Y. and Fairfield, Conn.
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Too much oil is wasteful; too little is dangerous.

Detroit Force Feed Oilers

drive oil to the points to be lubricated in accurately measured, unvarying quantities.

Manufactured by the Detroit Lubricator Company, known for forty years as the world's largest manufacturer of lubricating devices.

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Makers of Stewart Carburetors

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USEFUL BOOK

"Sea Craft Suggestions and Supplies" — 216 pages. Full of useful ideas. Tells how to box the compass—what is proper Ground Tackle; gives hints on Steering Gear, Stern Bearings, etc. Well worth having. Sent for 20 cents.



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For anchors up to 150 lbs. Has Winch Head for rope; wild-cat for chain cable. You can heave on a line—let the chain run free—or stop it instantly at any point. Three operations controlled by one Heaving Lever. No complicated parts.

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World's Largest Marine
Hardware Manufacturers
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Mfrs. of the Famous Maxm Motor Boat Silencer



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And Away You Go

ICE YACHTING

But On The Nicest Winter Day When There's No
Wind, You Can Speed Away

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**Easy to apply—easy to clean
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The Oldest Manufacturing Concern in the United States

Founded in New York 1754

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25 FOOT CABIN CRUISER

COCKPIT LOOKING FORWARD TOILET LAVATORY JCBURK CABIN LOOKING FORWARD

SKILL AND GOOD WORKMANSHIP KEEP THE COST LOW.

A good turn of speed—safe and able in severe conditions of wind and sea.

Our 25 foot cruiser is for those who must have a good boat. It is built for salt water service, copper fastened throughout. Construction and workmanship is the best,—equal in every respect to the high class of yacht work on which our reputation has been based for over twenty years.

Full information, plans and specifications will be sent on request. We shall be glad to have you inspect these boats at our works.

Each launch is of individual build, and orders should be placed as early as possible.

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All the year
DOWN SOUTH

Valuable Land Information FREE!

There are wonderful opportunities in the South for energetic farmers. Thousands of acres of fine farm land at cheap prices and on reasonable terms are waiting for development. No long and cold winters. Excellent climate, markets, transportation, water and health. Great cotton, corn, oats, hay, cattle, dairy, orange, grapefruit and market garden country. Splendid fishing and hunting.

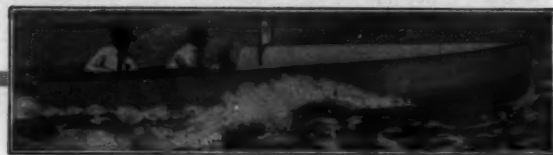
Two and Three Crops a Year

Farmers are getting rich in the South by intelligent application of modern methods. There is room for thousands more. The South is favored by nature and wants more settlers. Secretary of Agriculture Houston declared in a recent address that in point of climate and in length of grazing season the South has a material advantage over the rest of the nation.

FREE INFORMATION cheerfully furnished regarding Southern farmlands
You Are Invited to Write Today to the

Southern Land Bureau
GEORGIAN-AMERICAN
"The South's Greatest Newspaper"
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Build Your Own Boat



The above 17-footer, complete K. D. frame, together with all hardware to finish the boat .. **\$48**

Fastest Boats in the World

V-bottom Models from 15 to 22 Feet Long

WE furnish knock-down boats complete—all kinds and sizes—everything cut to shape and fitted—with full sized paper patterns and illustrated instructions for the amateur builder. There's both pleasure and profit in boat building. You save over $\frac{2}{3}$ the cost.

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The Largest Plant of its Kind in the World



Since 1868



Use Crockett's Varnishes Exclusively

There is no other way to insure the absolute maximum of service, durability and superb appearance. We have spent nearly fifty years of honest effort in maintaining the uniformly high quality of Crockett's Marine Varnishes.

Crockett's Spar Composition

The best known and most durable spar varnish ever made. It will not spot, crack, blister, scale or turn white under the severest exposure. Absolutely unaffected by fresh or salt water.

No. 1 Preservative

The perfect interior finish for boats, yachts and steamships. Not harmed by hot water and soap.

Waterproof Floor Finish

The perfect floor varnish for marine use. Write today for copy of our valuable booklet, "What to Use and How to Use It." Gives many important suggestions for the selection and application of varnishes for different purposes. Sent free on request.

The David B. Crockett Co.
Varnish Makers Since 1868
BRIDGEPORT CONNECTICUT

Red Wing Thorobred

THE MOTOR WITH POWER TO SPARE

"Word-of-mouth" Advertising

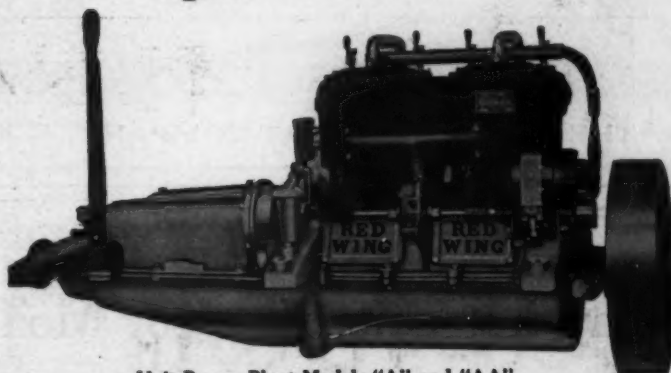


Unit Power Plant Model "F" THOROBRED
28-36 H. P., 4 1/16" x 5"
Furnished with or without Unit Power Plant

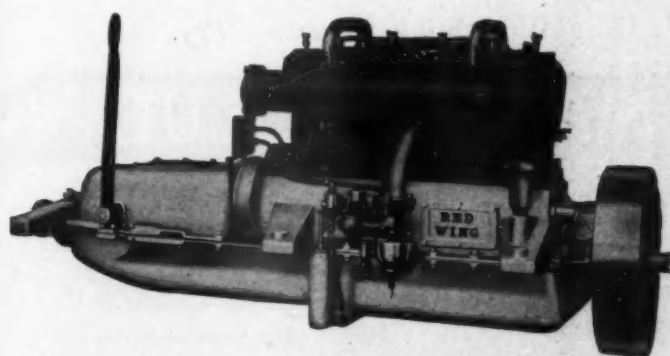
Word-of-mouth advertising soon kills an inferior product. Dissatisfied customers do not fail to warn their friends.

It soon becomes the gossip of the "game" that a certain engine is not everything that is claimed, and soon, indeed, do the bankruptcy courts get the makers.

And just as readily a satisfied buyer expresses his satisfaction—advises his friends of his own success that they may profit by his experience.



Unit Power Plant Models "A" and "AA"
THOROBRED
14-20 H. P., 3 1/4" x 4 1/4" 18-24 H. P., 3 1/4" x 4 1/4"
Furnished with or without Unit Power Plant



Unit Power Plant Model "B" THOROBRED
32-40 H. P., 4 1/4" x 5"
Furnished with or without Unit Power Plant

"It sells more goods every year than all the magazines, newspapers, bill boards and direct-by-mail stuff combined," declares a talented advertising man of our acquaintance, who adds that he "believes as firmly in the efficacy of written advertising as firmly as I believe in the Ten Commandments."

Whereon hangs a tale of success and a guide to the buyer of a marine engine.

This word-of-mouth advertising is largely responsible for the success of the Red Wing Motor Company and the Red Wing Thorobred Marine Motor. It is our buyers and friends who have spread the fame of the deserving Thorobred and quadrupled our business in the past few years. Popular approval is a safe criterion.

Thorobreds come in sizes from 14 to 40 H. P., \$225.00 and up.

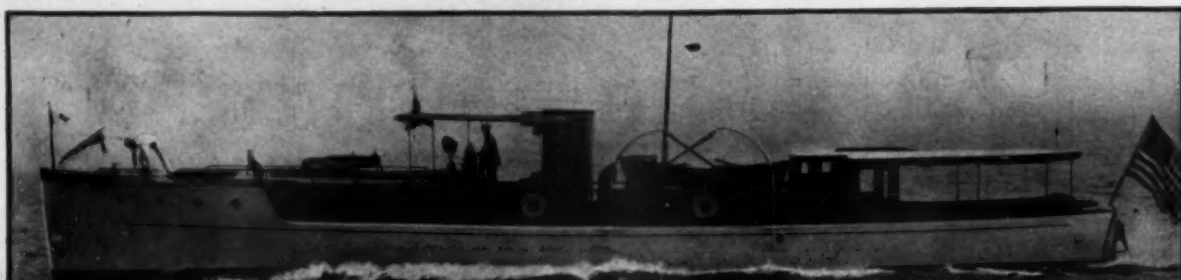
The Thorobred burns kerosene like an oil lamp, if desired.

Red Wing 2-cycle motors from 3 H. P. up.

Write us today for full information.

RED WING MOTOR COMPANY

Dept. B, RED WING, MINN., U. S. A.



Speed—Luxury—Comfort

MATTHEWS CRAFT

The skill exercised in constructing a Matthews craft assures you of reliable performance. The Workmanship, Material and Equipment used are of the highest grade.

The craft illustrated above was built for Mr. E. H. Close of Toledo, Ohio. You will enjoy reading what he has to say about his Matthews Craft.

TESTIMONIAL

THE E. H. CLOSE REALTY COMPANY, 513 Madison Street
Toledo, Ohio, October 19, 1916.

THE MATTHEWS BOAT CO., Port Clinton, O.
Gentlemen: Sometime within the next ten days it is my intention to send down the SUSANNE to your plant for winter storage. Perhaps it would not be out of place at this time to tell you my experience with the SUSANNE, which you delivered to me the last of August.

A person never really knows a boat until it has been in commission for several months, and being of rather an advanced type of construction, I was in some doubt as to the speed from a boat having so much beam and liberal accommodations. Both with respect to the convenience of her arrangement and the speed, the SUSANNE has more than met my expectation, and is particularly suited to the requirements of my family.

Under all conditions, the SUSANNE has made good, and I am looking forward to next season, anticipating much pleasure.

Yours very truly,
(Signed) E. H. CLOSE.

Literature and details gladly sent you.



THE MATTHEWS BOAT COMPANY

602 Laurel Ave., Port Clinton, Ohio

Why not subscribe for MoToR BoatinG right now?

If You Want a Friend That Will Stick Forever, Try

JEFFERY'S MARINE GLUE

In some places economy is all right, but when you come to Marine Glue the difference in cost between the ordinary and the best is so little that you can't afford to take the risk of having to do the job over again for the sake of saving a little on the material.

It pays to use Jeffery's in the first place, every time. Jeffery's is universally conceded to be the best and most reliable marine glue. Jeffery's Glues are specified by the best designers and used by the best builders. A little investigation will show you why.

No. 1—Extra Quality for Deck and Hull Seams of Yachts and Motor Boats. Black, white, yellow or mahogany color. Give black the preference; it is more elastic and satisfactory in every way.

No. 7—Soft Quality for Waterproofing Canvas, for Covering Decks, Tops of Cabins, Canvas Boats, Canoes and Flying Boats. Black, white or yellow. With a coat of paint once a year it will last as long as the boat.

Waterproof Liquid Glue is used for the same purposes as No. 7, Soft Quality. Ready for use and requires no heating; simply open the can and paint it on. Especially recommended in combination with linen between the diagonal of flying boats. Will also attach canvas, cork, felt, rubber, leather, and linoleum to iron, steel, or wood.

Special Marine Canoe Glue. Best Filler for Canvas. Black, White and Yellow. Every canoeist should carry one of our 25c emergency cans. Sent by mail on receipt of 30 cents in stamps.

FOR SHIP'S DECK USE No. 2 First Quality Ship Glue, No. 3 Special Navy Glue.
Put up in 1, 2, 3 and 5 lb. cans; also 14, 28, 56, 112 lb. boxes.

Sold by all Boat and Canoe Supply Houses, Hardware and Sporting Goods Dealers.
Write to-day for booklet "What to Use and How to Use It." It contains a fund of valuable information that every practical boat owner and builder should know.

L. W. FERDINAND & COMPANY, 152 Kneeland Street, Boston, Mass., U.S.A.

WIRELESS

for Motor Boats now Practicable



Type 2A Transmitting and Receiving Set. Transmits from 100 to 800 miles, depending on conditions.

CUTTING & WASHINGTON Wireless Equipment is especially designed for motor boats and yachts. It is *quiet*, simple, compact, reliable and *easy to operate*. It is not a toy, but a complete and powerful outfit, superior to the bulky, noisy equipments usually installed.

Our wireless outfits quickly prove themselves indispensable to the man who wants to keep in touch with his office and home, pick up news messages and receive weather and marine obstruction reports. All this, besides protecting the lives of his guests, as some wireless equipped vessel or land station is always within easy calling distance.

The law provides that every wireless land station must receive and transmit, or forward over land lines, any message at their regular rates to or from any ship, regardless of the system employed.

Our equipment, which is manufactured by trained engineers of great technical ability and experience, is so simple and safe that any electrician can install it in one or two days.

COMPLETE EQUIPMENT READY FOR OPERATION, \$250.00 and up.

Write today for full information

CUTTING & WASHINGTON, Inc.

RADIO ENGINEERS AND MANUFACTURERS

24 Portland St., Cambridge, Mass.

Write for New L-A Engine Book

YOUR Engine Makes or Mars Your Motor-ing Pleasure, so don't decide definitely on the engine for your boat until you have read the new L-A Engine Book—new—just off the press. It fairly bristles with valuable suggestions and interesting engine information. This new L-A Engine Book describes and depicts in detail the complete line of L-A inboard and out-board motors for launches, row-boats, work-boats, etc. It provides you with complete particulars covering our

30 Days' Trial Plan

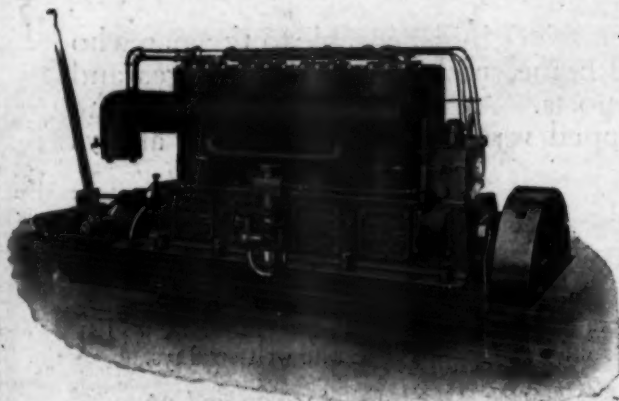
which allows you the privilege of proving the performance of L-A motors before making your final decision. Write for your copy today.

LOCKWOOD-ASH MOTOR CO.

1401 Horton Ave., Jackson, Mich.



The "Automatic"



Every motorboat owner wants an engine that will give greater mileage for less expense, one that will stand up to the hardest work.

Install an **Automatic** in your boat. It is, we believe, the most reliable, economical engine made. It has remarkable power and flexibility.

It is compact and accessible. It has removable bronze bearings, an enclosed speed governor, a built-in oiling system—and many other features.

It is not an experimental engine. The **Automatic** has held the leadership for years. It will give you thoroughly efficient service. Write for catalog.

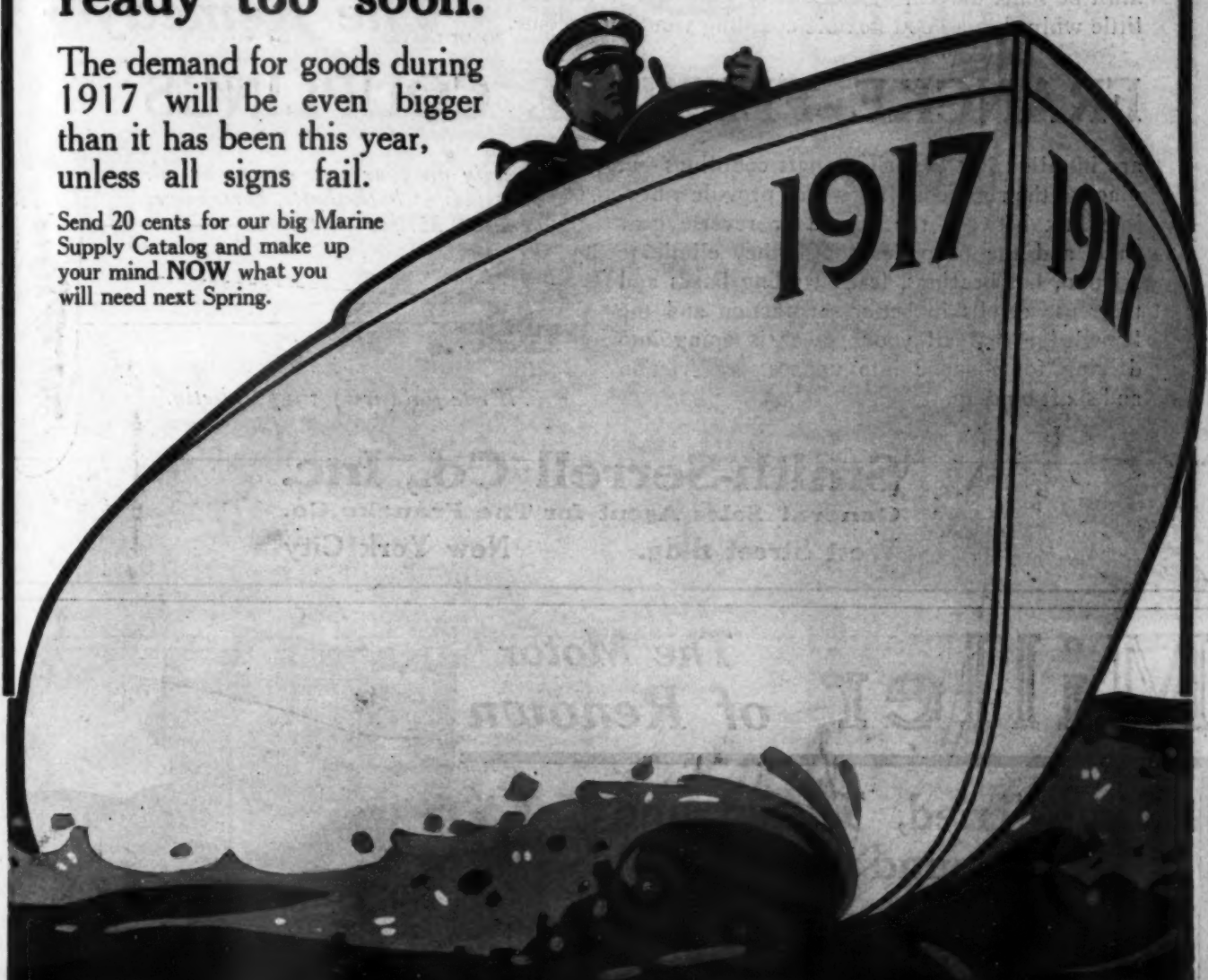
The Automatic Machine Co., Bridgeport, Connecticut

SHE'S COMING FAST

1917 is almost here and you can't get ready too soon.

The demand for goods during 1917 will be even bigger than it has been this year, unless all signs fail.

Send 20 cents for our big Marine Supply Catalog and make up your mind **NOW** what you will need next Spring.



GEO. B. CARPENTER & CO.

MANUFACTURERS & DISTRIBUTORS OF

MARINE SUPPLIES

MOTOR BOAT ACCESSORIES, RACING SAILS,
TENTS, AWNINGS, FLAGS & COVERS

440 WELLS ST. CHICAGO.

A Real Complaint—

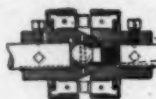
"The engine and propeller shaft are carefully aligned, but I have found twice the past season on taking my rigid coupling down that it was a trifle out of alignment. Then take my boat going 20 miles per hour in a rough sea—there must be some movement or twist of hull that would make a little whip that a good flexible coupling would overcome."

The Remedy—

FRANCKE FLEXIBLE COUPLINGS

are installed just like rigid shaft couplings—in place of the rigid coupling—they provide a flexible link between the engine or reverse gear shaft and the propeller shaft—they eliminate friction, hot bearings, leaky stuffing boxes and their use results in better satisfaction and the knowledge that all your power is going into driving force—none into unnecessary friction and shaft binding.

Specify on your new engine or advise sizes of both shafts, horsepower and R.P.M. for quotation.



Write for (new) 1917 Bulletin.



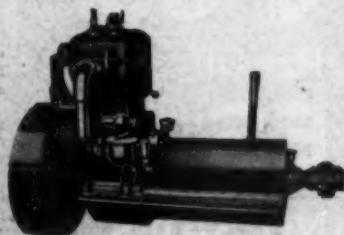
Smith-Serrell Co., Inc.
General Sales Agent for The Francke Co.
West Street Bldg. New York City

Miller The Motor of Renown

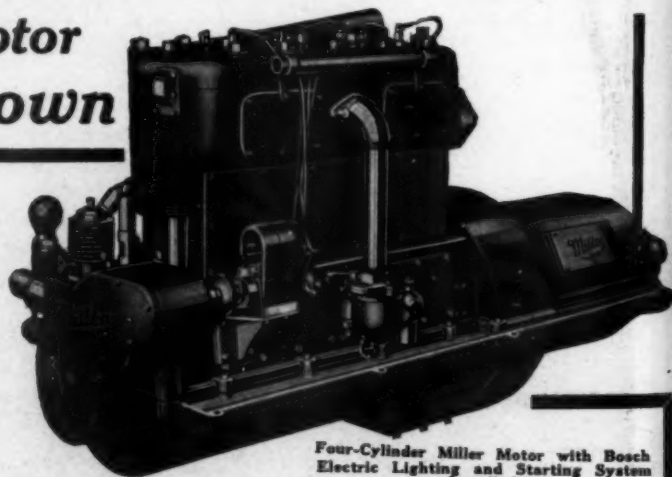
Time-Tried, Tested and Not Found Wanting

IF you want a medium duty or heavy duty power plant that is backed up by many years of successful service, get a Miller Motor. There are more expensive engines and more widely advertised engines, but there isn't a better built one. We have always striven for quality, not quantity, of output.

Miller prices represent 100 cents' worth of engine value to the dollar. We haven't the tremendous overhead expense of the big factories. Still we manufacture enough motors to secure economy in production. When you know the reliable quality of Miller Motors, the prices will speak for themselves.



If you want 4 or 6 H.P., you will find the one-cylinder Miller F-1 and I-1 models hard to beat. They are high grade four-cycle engines, and we haven't skimped the quality because they are our smallest



Four-Cylinder Miller Motor with Bosch Electric Lighting and Starting System Installed.

models. We build three two-cylinder vertical models, from 8 to 15 H.P., also five double opposed motors.

Miller Four-Cylinder Motors are built in eight models, from 10 to 75 H.P. They are the very best in design, materials, workmanship and equipment. We use the Bosch Duplex Magneto and Bosch-Rushmore starting and lighting system.

Miller Motors are designed to operate at 350 to 1000 R.P.M., depending upon the class of duty. Furnished for burning kerosene, distillate or other low grade fuels, if so specified in order.

The Miller Portable Motor

Positive reversible weedless propeller, operated by the steering lever. The movable blades are adjustable to any pitch, thus automatically providing for a variable speed in either direction. 2½ H.P., Bore 2¼ in., Stroke 2½ in. Ignition by Battery or Bosch Dixie Magneto.

Write today for latest illustrated catalog which describes the entire line of Miller Motors.

MILLER GAS AND VACUUM ENGINE CO.

2329-2331 North Talman Avenue

Chicago, U. S. A.

Agents: Consolidated Gas & Gasoline Engine Co., 202 Fulton St., New York City
Sole Agents for Australia: A. J. Dadson & Co., 9 Hamilton St., Sydney, N. S. W.

For YOUR boat

JOE'S REVERSE GEAR

WE build Joe's Reverse Gears and Clutches for every size and type of boat. You may have a hydroplane, launch, cruiser, or perhaps a big tug or heavy freighter; no matter which you have, we build the clutch that will give you the most service and satisfaction for your money.

Joe's Gears are known the world over. They are used in record breaking speed boats like Miss Detroit (shown below), Miss Minneapolis, and in passenger boats, commercial boats, auxiliaries, cruisers, etc. They excel in the qualities that make a good gear worth while.

Joe's Duplex Drive is the only heavy duty gear with nearly the same speed ahead and astern that does not depend on locked gear teeth for forward drive.

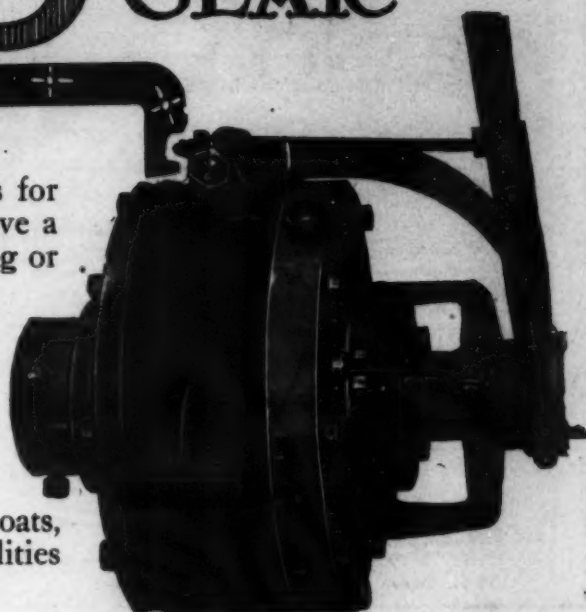
Write today for latest catalog. It contains valuable information you should have before you select any gear, clutch, or starter. It is free.

The Snow & Petrelli Mfg. Co.
154 Brewery Street New Haven, Conn.

JOE'S SAFETY Rear Starters

A genuine safety device and a sure protection against kick back. Mounted either on adjustable frame or bulkhead bracket, and may be attached at either end of the motor. Saves labor, money and injury. Price reasonable.

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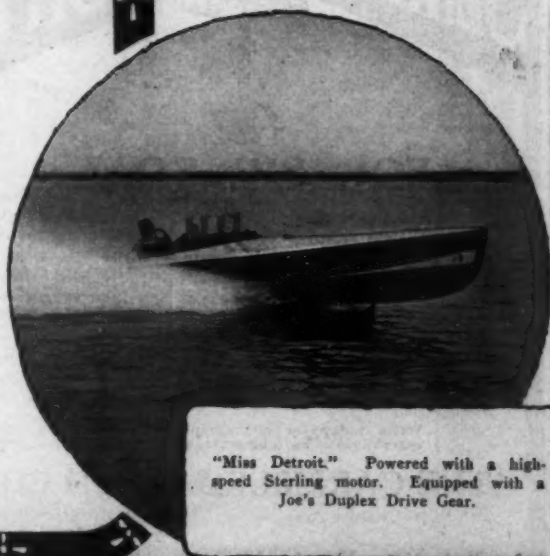


JOE'S DUPLEX DRIVE HEAVY DUTY REVERSE GEARS.
For Heavy Boats and Racing Craft.

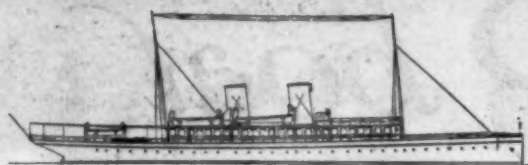
JOE'S FAMOUS HIGH POWER GEARS.
For High and Medium Speed.

JOE'S HIGH SPEED ONE-WAY CLUTCHES.
Especially for Hydroplanes and High Speed Propositions; Smallest Size Transmits 30 H. P. at 1,000 R. P. M.

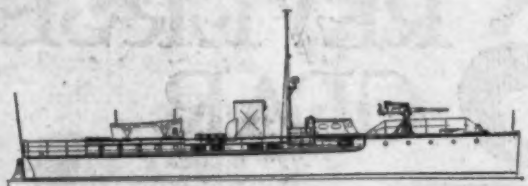
JOE'S REGULAR ONE-WAY CLUTCHES.
A high class, low priced clutch for general uses.



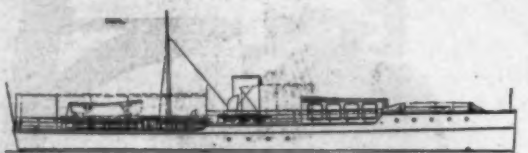
"Miss Detroit." Powered with a high-speed Sterling motor. Equipped with a Joe's Duplex Drive Gear.



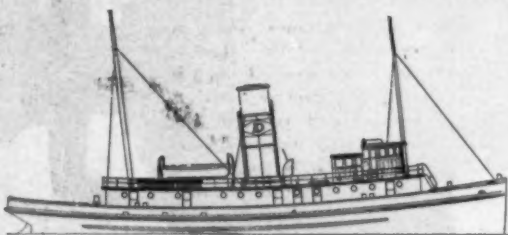
151 ft. Motor Cruiser, Diesel Engines.



73 ft. Patrol Boat, Gasolene Engines.



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130 ft. Ocean Tug, Triple Expansion Steam.

BOWES & MOWER NAVAL ARCHITECTS & ENGINEERS

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LAFAYETTE BUILDING
CHESTNUT & FIFTH STREETS
PHILADELPHIA

BOTH BOWES
CABLE BOND

To the

January 1st, 1917.

Prospective Builder.

Dear Sir:

We are prepared to design and supervise the construction of yachts and commercial vessels of any size or type and give you the benefit of our technical skill, plus years of practical experience.

At present we have on order or under construction yachts of all types from a 151 foot sea-going cruiser, equipped with Diesel engines to auxiliary sailing yachts, including scout patrol boats and express cruisers with guaranteed speeds up to forty miles per hour. Our orders for commercial vessels include sea-going tugs, ocean barges, power lighters and fire boats.

Our charges for plans and professional services are reasonable and no obligation is incurred by consulting us in regard to any proposed work.

We are

Yours very truly,

BOWES & MOWER

CARLISLE & FINCH SEARCHLIGHTS

FOR BIG BOATS

Any boat that requires a reliable searchlight projector with great penetration should have a genuine Carlisle & Finch Searchlight. Even the smallest sizes throw a good beam of light for half a mile, or more. Our searchlights are the standard of the world. Used on yachts, passenger boats, river and lake steamers, ocean liners and battleships. None better made. Sizes from 7 inches to 60 inches diameter. We also make electric lighting plants and generating sets for launches, yachts and other uses. Sizes from ½ K. W. to 12½ K. W.

Write today for our complete catalog of searchlights, switchboards and generators.

THE CARLISLE & FINCH CO.
261 East Clifton Avenue Cincinnati, Ohio

More Pleasure From Your Motor Boat

You practically double the pleasure of motor boating when you have the same perfect control over your engine as the automobile driver enjoys.

There's a world of satisfaction in being able to stop, reverse, or go ahead instantly as desired—in knowing that your boat is under perfect control at all times. And then when you get in a tight place—when there is danger of accident—your reverse gear, if it is the reliable kind, is a priceless addition to your outfit.

Baldrige Reverse Gear

Baldrige reliability has been proven by years of service. It has but one main shaft, extending from bearing to bearing—it cannot possibly sag, wobble or get out of alignment.

The Baldrige "idles" perfectly. It carries far greater overload than its rated capacity. Gears are completely enclosed and perfectly lubricated.

Double expansion clutches with reinforced reverse bands—gears heat treated and hardened by scientific modern methods.

Get the Baldrige Book today—you owe it to your motor boat.

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238 Mt. Elliott Ave. Detroit, Mich.

"The Gear with the unbroken Main Shaft"



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McQUAY-NORRIS LEAK-PROOF PISTON RINGS



This angle-to-angle interlocking construction is the distinctive feature of the genuine **Leak-Proof** Ring. These two sections are of equal size and strength, which gives the ring equal tension all around—the only form of construction that makes this possible.

When you ask for leak-proof piston rings it's the genuine McQuay-Norris **Leak-Proof** Piston Rings you want. You buy them because you know they are the real power producers, fuel savers, carbon reducers.

No other piston ring is made with the mechanical perfection of the McQuay-Norris **Leak-Proof**, and, therefore, it can not possess the qualities of the Genuine.

Protect yourself and your trade against substitute and imitation rings. You can always tell the Genuine by the name **Leak-Proof** stamped on every ring—the exclusive angle-to-angle interlocking construction of the two members.

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"To Have and to Hold Power" — the standard handbook on gas engine compression. It tells what McQuay-Norris **Leak-Proof** efficiency means, and why the Genuine is the only "leak proof" Ring. Write Department B.

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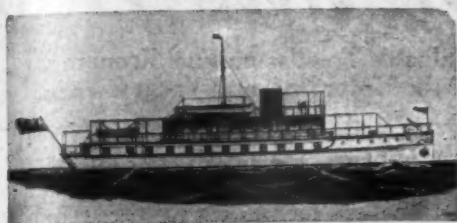
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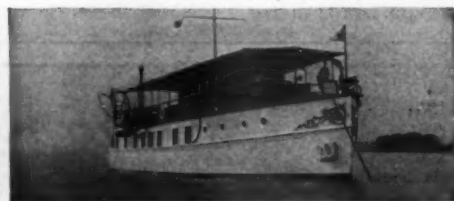
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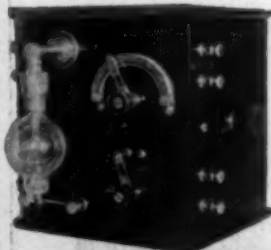
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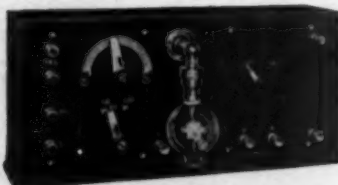
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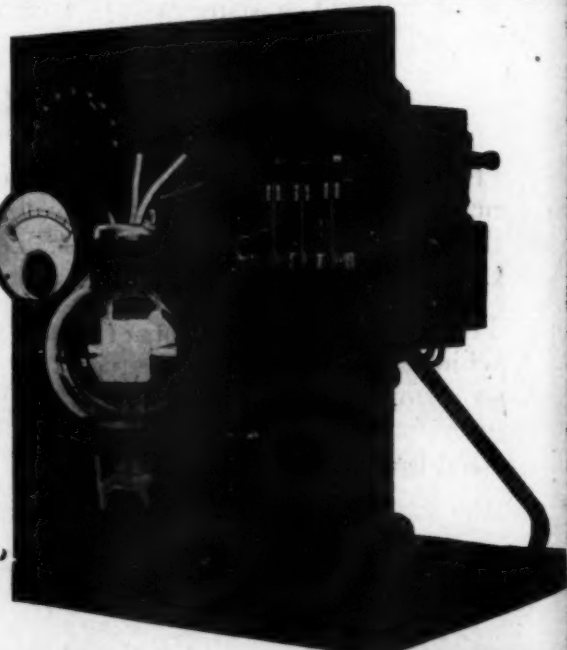
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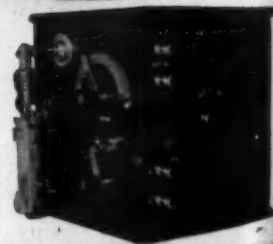
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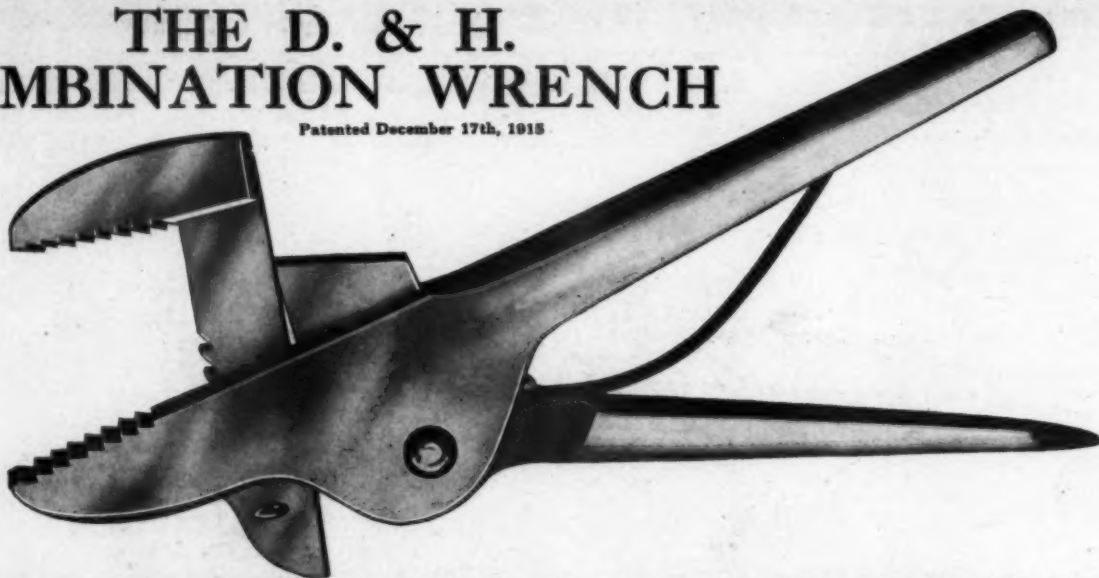
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Is an open end, take up, monkey, pipe, socket and ratchet wrench combined, instantly adjusted for pliers and has screw-driver point; in fact, is six tools in one.

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CURTISS YACHT CAPSTAN



Fig. 2008

This Capstan is intended for Boats between 50 and 85 feet, as it is made for $\frac{3}{8}$ inch B. B. Chain only.

Has handles on each side and is very powerful.

Friction brake in head controlled by wheel at after end.

Capstan runs either right or left, controlled by ring on forward part of head.

The essential feature of this Capstan is: may be used for either rope or chain, or both at same time; the wildcat may be used independently of rope drum and vice-versa, the drum may be worked with wildcat fixed, by simply removing the pin which binds the drum and wildcat together; the only small Yacht Capstan possessing this feature.

Weight, 105 pounds.

Dimensions: Height, 15 inches; Diameter of Head, $10\frac{1}{4}$ inches; Diameter of Base, $12\frac{1}{4}$ inches.

Price, all Bronze, Polished.....\$125.00

Price, Galvanized 70.00



Fig. 2003

A compact Galley Pump that may be set at any angle required.

$1\frac{1}{4}$ -inch Bore $2\frac{3}{4}$ -inch Stroke

Polished Brass Each, \$8.50

Nickel-Plated " 10.00

With Pump

Lining and Fixtures Nickel-plated. Porcelain Bowl. Mahogany or Quartered Oak Case.

Cock on pump swings upward, thus preventing breaking of bowl. Soap-dish is porcelain and removable.

No. 5

Height, 19 inches Width, 19 inches

Depth Closed, 6 inches

Quartered Oak Case..... Each, \$42.50

Mahogany Case " 44.00



Fig. 1404



Fig. 1392

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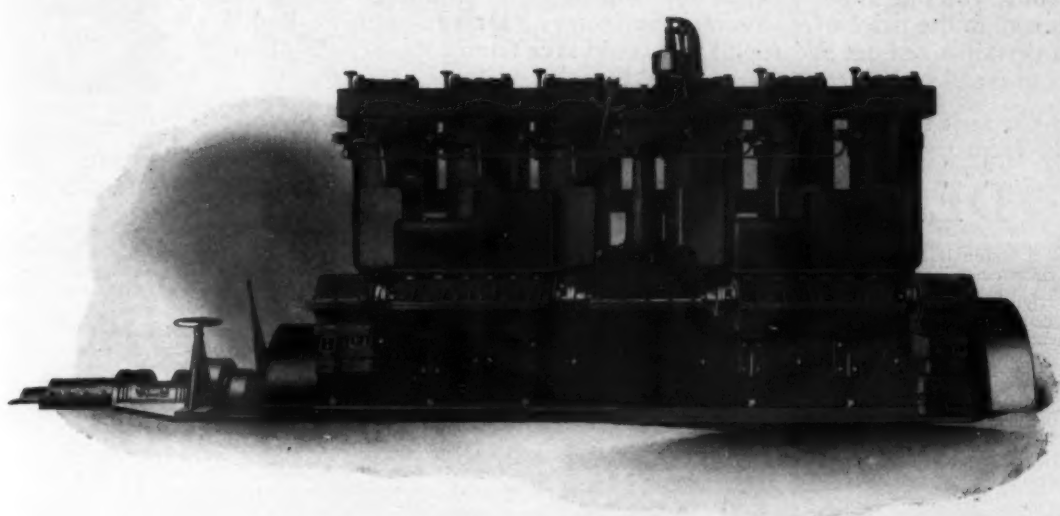
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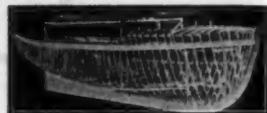
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DEFOE K. D. BOATS

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We also build finished boats. The beautiful cruiser shown below, recently launched at our plant, is a splendid example. Our finished boat department guarantees practical design and construction for our K. D. boats, while the K. D. department increases our output and thus lowers the cost of building our finished boats. Whichever way he buys, the Defoe customer is benefited by the completeness of Defoe service and facilities.



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We are selling Defoe K.D. Boats and Frames in every part of the world—little boats, big boats, cruisers and commercial boats—all types and sizes. Especially good for export.

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Wright Heavy Duty Marine Engines

For a big cruiser or a heavy commercial boat there is only one kind of an engine to buy. That is a reliable engine,—one that will endure the hardships of continuous severe service without delays for repairs and replacements.

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The kerosene is converted into a perfect gas—not merely a wet vapor—by supplying the kerosene carburetor with hot air and then passing the vapor through a heated generator which gasifies it. This prevents all carbon trouble in the cylinders and on the valves, and gives an exhaust as clear as on gasoline.

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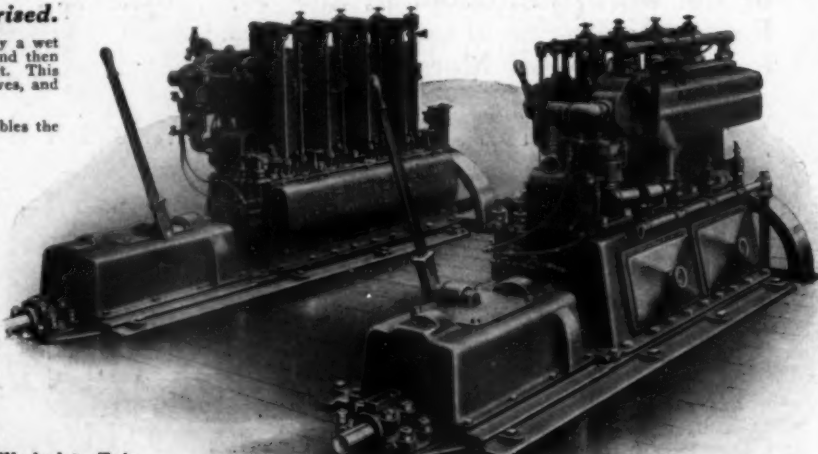
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6-Cyl.6	x 7 1/2"	45-65 H. P. Screw Outfit
6-Cyl.7 1/2	x 9	70-90 H. P. (right and left engines) equip-
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6 x 7 1/2" runs from 400 to 550 R. P. M.
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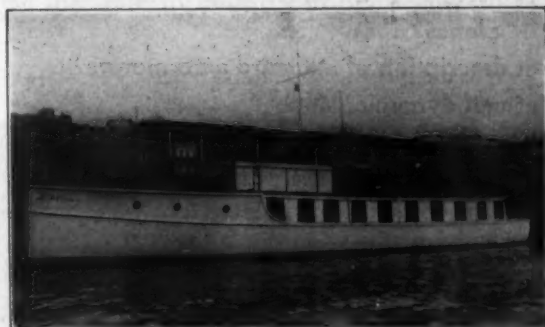


"A 20th Century Boat"

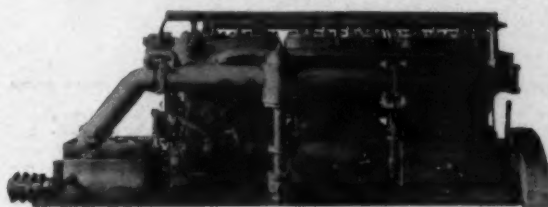
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4-Cylinder, 40-50 h.p.
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AND you will have an accurate idea of the *continual load* on a marine motor. There's no chance to "coast" on the water—no down hill for you to glide on.

So you see how necessary it is to have a transmission that *really transmits* all your power *all the time*.

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Yours very truly,
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Yours truly,
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King of Marine Carburetors

KINGSTON
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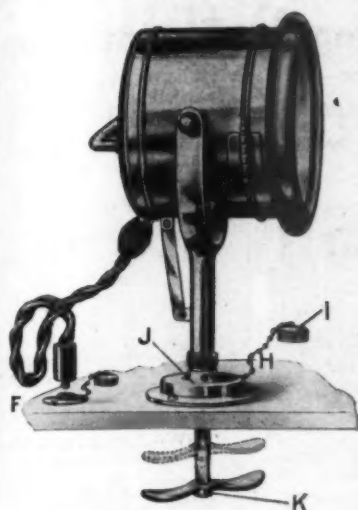
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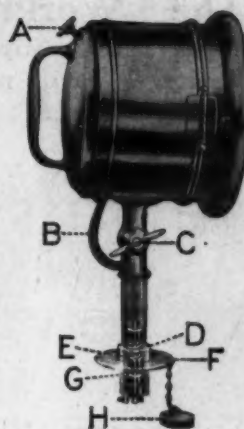
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Cello Electric Lighting Outfits have long been favorites with owners of motor boats and yachts because they combine the highest degree of light efficiency, current economy, convenience, durability and freedom from troubles.

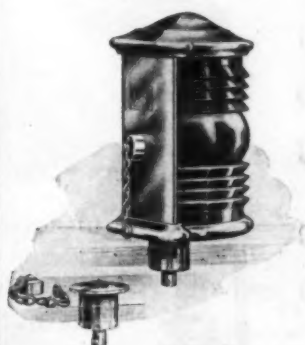
The Cello Wire-less feature is especially popular. No wires above the deck to get watersoaked. They have a flush socket on deck which is waterproof at all times.



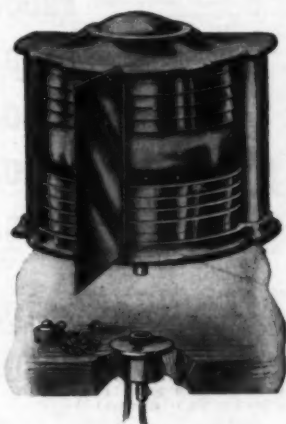
Wire-less Deck Searchlight



Pilot House Control



Cello Wire-less Running Light, which has no wiring above deck



Combination Light



Stern Light and Flag Pole Combined



Combination Flag Pole



Wire-less Bow Light

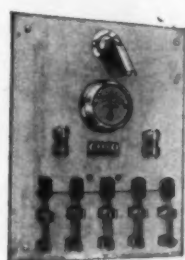
Wire-less Side Light



Dome Lights



Cabin Side Fixtures



Switch Boards



Hand Lamp



Storage Battery

A. S. CAMPBELL CO., 286 Commercial St., Boston, Mass.

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"SANDS" MARINE SANITARY FIXTURES

The World's Best Value in Marine Plumbing
Highest quality—Superior appointments—Longest efficient Service—
Minimum expense without reserve
Prompt shipment and maintenance—First cost reasonable—Guaranteed



"NATIONAL," PLATE S-2010.
(Patented—Copyrighted.)



"FLORIDA," PLATE S-2015.
(Patented—Copyrighted.)



PLATE S-2035

The "Huron" Composition Flange Sea Valve, with straight couplings and locking plate, for use on the supply and discharge of small pump closets.
Price per pair with strainer for supply \$6.00



"HURON," PLATE S-2035.
(Patented—Copyrighted.)



"IOWA," PLATE S-2040.
(Patented—Copyrighted.)



PLATE S-131.
The "Carlin" Brass Outlet Connection, Iron Pipe:
1/2 in. \$1.75
1 in. 2.50
1 1/2 in. 3.75



THE "FRISCO," PLATE S-2046.
(Design Patented—Copyrighted.)

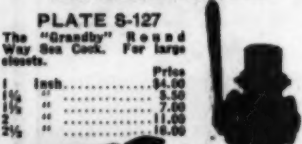


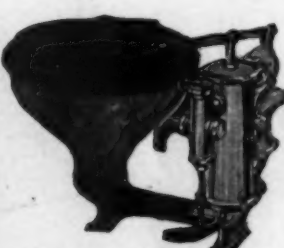
PLATE S-127
The "Grandy" Round Way Sea Cock. For large closets.
1 in. \$4.00
1 1/2 in. 5.50
2 in. 7.00
2 1/2 in. 11.00
3 in. 16.00



THE "BOW" CLOSET,
PLATE S-2050.
(Patented—Copyrighted.)



"YUKON"—PLATE S-31A



"KNOCKABOUT," PLATE S-34.
(Patented—Copyrighted.)



"FLORIDA-ELECTRIC"—Plate S-2018
(Design Patented—Copyrighted.)



"MOHAWK IMPROVED,"
(Patented—Copyrighted.)
PLATE S-2030.



"WINNER"—PLATE S-2061



"COMMERCIAL," PLATE S-2070.
(Patented—Copyrighted.)

Plate S-2018

"Florida-Electric" Improved Pump Closet, with Vitro-Adamant Oval Pedestal Bowl, 4" Combined Supply and Waste Pump, Fitted with Automatic Safety Supply Foot Valve Back Water Check Valve. Operated by Electric Motor and All Mounted on Metal Base Plate. Pump and Motor, finished White Enamel with Nickel Plated Trimmings, Oak Woodwork.

\$300.00

Plate S-2010

"National" Pump Closet, Vitro-Adamant Pedestal Bowl, 5" Combined Supply and Waste Pump. Price: Rough pump, finished trimmings, oak woodwork.

\$133.00

Plate S-2015

"Florida" Pump Closet, Vitro-Adamant Pedestal Bowl, 4" Combined Supply and Waste Pump. Price: Rough pump, finished trimmings, oak woodwork.

\$100.00

Plate S-2035

"Huron" Pump Closet, Vitro-Adamant Hopper Bowl, 5" Combined Supply and Waste Pump. Price: Rough pump, finished trimmings, oak woodwork.

\$120.00

Plate S-2040

"Iowa" Pump Closet, Vitro-Adamant Hopper Bowl, 4" Combined Supply and Waste Pump. Price: Rough pump, finished trimmings, oak woodwork.

\$85.00

Any of the Above Closets—Pump White Enamelled, Nickel Plated Trimmings, Mahogany Woodwork, Add \$12.00

Plate S-2030

"Mohawk Improved" Pump Closet, Vitro-Adamant Hopper Bowl, 3" Supply and Waste Pump. Price: Rough pump, oak woodwork.

\$70.00

Plate S-2046

"Frisco" Pump Closet, Vitro-Adamant Oval Hopper Bowl, 3" Combined Supply and Waste Pump, all metal parts smoothed. Price, Oak Seat and Cover. (The "Frisco" Closet always sent with Pump at Left Hand, as shown, unless right hand pump is specified.)

\$60.00

Plate S-31A

"Yukon" Pump Closet, Vitro-Adamant Pedestal Bowl, 2 1/2" supply and waste pump. Price, pump rough, oak woodwork.

\$55.00

Plate S-34

"Knockabout" Pump Closet, Vitro-Adamant Hopper Bowl, 2 1/2" Supply and Waste Pump. Price: Rough pump, polished trimmings, oak woodwork.

\$52.50

Plate S-2070

"Commercial" Closet for "Work Boats," Vitro-Adamant Oval Bowl, Composition Flush Valve. A Special Single Valve Closet Used Above Water Line Only. Metal parts painted white, with N. P. trimmings, oak seat, no cover.

\$47.50

Plate S-2050

"Bow" Pump Closet, Vitro-Adamant Hopper Bowl, 3 1/4" Supply and Waste Pump in rear of bowl. Price: Rough pump, oak woodwork.

\$30.00

Plate S-2061

"Winner" Pump Closet, Vitro-Adamant Hopper Bowl, 2 1/4" Supply and Waste Pump. Price: Rough pump, oak seat and cover.

\$20.00

Inlet and outlet of all pump closets are protected by "Sands" Patent Backwater Check Valve and "Sands" Patent Automatic Safety Supply Foot Valve.

Regardless of the abnormal high prices of material and labor, list prices are unchanged. Selling prices necessarily are advanced to meet conditions ranging from list prices as set up to 50% advance over list based upon cost of material.

Complete line of closets, lavatories, and specialties described in NEW Catalogue "R" ready in near future, sent free on request.

A. B. SANDS & SON COMPANY

Largest Manufacturers in the World MARINE PLUMBING SPECIALISTS 22-24 Vesey St., New York, U. S. A.
1849—"SIXTY-EIGHT YEARS OF QUALITY"—1917

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THE RECOGNIZED STANDARD OF THE WORLD

A COLLECTION OF LAVATORIES, PUMPS, PORT LIGHTS AND SPECIALTIES IN STOCK FOR IMMEDIATE SHIPMENT



Plate S-150

The "Glenwood" Folding Lavatory, with Vitro-Adamant oval basin, N. P. copper lining, N. P. brass double-acting pump, N. P. brass trimmings. Quartered oak, polished finish.....\$42.50 Mahogany, polished finish.....44.00

Plate S-152

"Crosby" Folding Lavatory, same as Plate S-150, except with faucet for pressure or gravity supply. Quartered oak, polished finish.....\$37.50 Mahogany, polished finish.....39.00

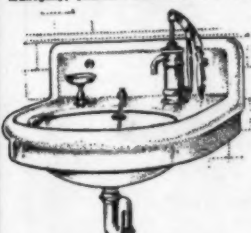


Plate S-208B.

The "Madison" Vitro-Adamant Lavatory in one piece, N. P. double-acting brass pump, N. P. brass full "S" trap, with waste pipe to deck. White enameled bulkhead brackets. Price.....\$35.00

Plate S-207B.

The "Majestic" Lavatory, same as above except square front \$35.00



Plate S-3190.

The "Mason 12" Vitro-Adamant Corner Lavatory with N. P. Brass Pump and waste fittings and N. P. Full "S" Trap.....\$24.50

Plate S-3196.

The "Mason" Lavatory, same as Plate S-3190, except with faucet, instead of pump and without trap.....\$9.25



Plate S-3380.

Small Vitro-Adamant 12" Flat Back Lavatory, with Nickel Plated Plug and Stopper, Chain and Stay, Nickel Plated Faucet, Trap, Standing Soap Dish, N. P. 730 Supply Pump. Complete as described.....\$18.95

PLATE S-4765



Port Light with Sleeve

Dia.	Opp.	Price
4"	\$4.25
5"	5.00
6"	5.25
7"	7.95
8"	10.00
9"	12.75
10"	16.75
11"	24.50
12"	28.50



Plate S-145.

The "Hebron" Vitro-Adamant Folding Lavatory, N. P. brass combination self-closing faucet for hot and cold water, N. P. brass waste coupling and towel rack. Complete.....\$42.50 Weight: Net, 45 lbs.; Gross, 75 lbs. Dimensions: Height over all, 20 1/2 in.; width, 16 1/2 in.; depth open, 17 in.; depth closed, 7 in.



Plate S-3180

The "Medec" 12" round front Vitro-Adamant Lavatory, with N. P. Compression faucet, waste fittings and full "S" trap.....\$11.25



Plate S-3183.

The "Manatee 14" Vitro-Adamant, Flat Back Lavatory, with N. P. Basin Pump and waste fittings; no trap.....\$22.75

Plate S-3180.

The "Manard" Lavatory, same as Plate S-3180, except with faucet, instead of pump and with N. P. Full "S" Trap.....\$13.25

Small Vitro-Adamant Corner Lavatory only 12" on side, with Nickel-Plated Plug, Stopper, Chain and Stay, Nickel-Plated Faucet, Trap, Standing Soap Dish, N. P. 707 Supply Pump. Complete as described, \$28.50



Cast Bronze Round Raised Strainer, with self-cleaning perforations. Used on water supply for any and all purposes. Flange drilled for screws.

2 1/2"	.....\$0.35	3"	.....\$1.00
3 1/2"	......50	4"	.....1.50
4 1/2"	......75	5"	.....2.25
6"	.....\$3.00		

Plate 130 1/2 B.



Plate S-186.

The "Aero" Folding Lavatory, N. P. copper basin and slab, N. P. composition single-acting pump, N. P. Copper lining; oak woodwork.....\$23.00 Height over all, 18 1/2 inches; width, 15 inches; depth closed, 8 1/4 inches; depth open, 14 1/2 inches; basin, 10 inches.

Plate S-187.

"Aero" Folding Lavatory; same as Plate S-186, except with faucet. Oak Woodwork.....\$22.50 Mahogany Finish.....25.00



PLATE S-209A

The "MARTIUS" Vitro-Adamant Lavatory, N. P. Composition Pump, N. P. brass supply pipe, compression faucet, N. P. soap dish, chain, stay and rubber stopper, N. P. brass full "S" trap with waste pipe to deck.....\$38.50

PLATE S-207A

"MAJESTIC" Vitro-Adamant Lavatory, similar to Plate S-207A, except flat back instead of corner type. Price, complete with pump below.....\$37.50



PLATE S-707

All Brass, Basins, Sinks or Bilge Pumps, with 2" cylinder, mounted on hardwood plank, rounded handle, 1/2" for rule and clip, can be used either right or left hand. Pump rough, with finished trimmings.....\$0.50 Pump and bearing polished.....\$1.00 Pump and bearing nickel plated.....\$12.00

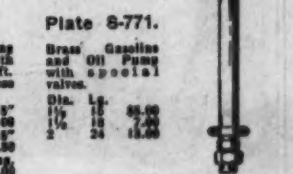


Plate S-771.

Dia.	Lg.	Price
1 1/2"	18"	\$5.00
1 1/2"	18"	7.50
2"	24"	15.00



Plate S-709.

All Brass Bilge Pump, 1 1/2 in. cylinder, reversible handle with shut-off cock. Polished.....\$8.50 N. P. all over.....10.50



Plate S-4254.

Basin Pump with low down spout 1 1/2" cylinder. For use in cock hole of lavatory. Pol. Brass.....\$12.00 Nickel Plated.....14.00



Plate S-5200.

Neptune Motor Boat Bow Lavatory Bracket; hinges permit bracket to lie on deck when not in use. Polished Brass.....\$0.75



Plate S-750.

Double Acting Brass Auto Bilge Pump, 15 inches long under spout and fitted with 5 feet of rubber hose. No. 1-1 1/2" diam., \$3.00 No. 2-1 1/2" diam., 4.50 No. 3-1 1/2" diam., 24" ring, with foot rest, \$5.50



Plate S-4300.

"Sands" New "Volume" Bilge Pump is 28" long, with 2" cylinder, fitted with 5 rubber hose. Capacity 1 gallon every 4 strokes. As described.....\$4.50

Plate S-4301.

Same as above, but also fitted with adjustable foot rest.....\$5.50



PLATE S-128

The "Helena" Composition Outboard Connection with flap valve and coupling used on discharge of closets, lavatories, sinks or on exhaust of engine.

1/4"	1"	1 1/4"	1 1/2"	2"
L. P. \$2.00	\$2.75	\$3.75	\$5.00	\$7.00
I. P. 2.00	2.50	3.50	4.50	6.50



Plate S-750A.

New Style Double-Acting Brass Bilge Pump, with foot attachment and 5-ft. discharge and suction hose with brass strainer. No. 1-1 1/2" diam., 15" long.....\$6.00 No. 2-1 1/2" diam., 18" long.....\$8.50 No. 3-2" diam., 24" long, \$14.00



PLATE 130 1/2 B

Cast Bronze Strainer and scoop used over inlet to engine. Made in three sizes and packed with screens. 2 1/2" x 3 1/4".....\$0.25 3" x 4"......75 3 1/2" x 5".....1.00



PLATE S-1001

Round Frame Composition Port Light, with one clamp, for wood vessel. Dia. Ft. Pol. Opp. Brass. Brass. 3".....\$2.50 \$4.00 4".....2.75 4.25 5".....3.15 4.50 6".....4.40 6.00 7".....5.50 7.25 8".....6.50 8.25



Plate S-4280.

New Pattern Improved All Brass Bilge Pump, 2" cylinder with shut-off cock. Pol. Brass.....\$12.50 Pol. & N. P. 14.00



PLATE S-1002

Round Flange Composition Monitor Air Port, with heavy brass frame and hinge. Diam. of Opening Price Diam. of Flange Price 9".....\$10.75 12".....\$17.00 10".....13.00 14".....25.00 12".....14.50 16".....28.00 Larger sizes also made

PLATE S-1003

Partlight, fitted with storm shutter. Price on application.



Plate S-132 1/2.

Cast Bronze Heavy Pattern Inlet Connection with Strainer and Scoop. Iron Lead Pipe 1/2".....\$2.25 3/4".....2.50 1".....3.00 1 1/4".....3.50 1 1/2".....4.00 2".....5.00 2 1/2".....6.00 3".....7.00 3 1/2".....8.00 4".....9.00 4 1/2".....10.00 5".....11.00 5 1/2".....12.00 6".....13.00 6 1/2".....14.00 7".....15.00 7 1/2".....16.00 8".....17.00 8 1/2".....18.00 9".....19.00 9 1/2".....20.00 10".....21.00 10 1/2".....22.00 11".....23.00 11 1/2".....24.00 12".....25.00 12 1/2".....26.00 13".....27.00 13 1/2".....28.00 14".....29.00 14 1/2".....30.00 15".....31.00 15 1/2".....32.00 16".....33.00 16 1/2".....34.00 17".....35.00 17 1/2".....36.00 18".....37.00 18 1/2".....38.00 19".....39.00 19 1/2".....40.00 20".....41.00 20 1/2".....42.00 21".....43.00 21 1/2".....44.00 22".....45.00 22 1/2".....46.00 23".....47.00 23 1/2".....48.00 24".....49.00 24 1/2".....50.00 25".....51.00 25 1/2".....52.00 26".....53.00 26 1/2".....54.00 27".....55.00 27 1/2".....56.00 28".....57.00 28 1/2".....58.00 29".....59.00 29 1/2".....60.00 30".....61.00 30 1/2".....62.00 31".....63.00 31 1/2".....64.00 32".....65.00 32 1/2".....66.00 33".....67.00 33 1/2".....68.00 34".....69.00 34 1/2".....70.00 35".....71.00 35 1/2".....72.00 36".....73.00 36 1/2".....74.00 37".....75.00 37 1/2".....76.00 38".....77.00 38 1/2".....78.00 39".....79.00 39 1/2".....80.00 40".....81.00 40 1/2".....82.00 41".....83.00 41 1/2".....84.00 42".....85.00 42 1/2".....86.00 43".....87.00 43 1/2".....88.00 44".....89.00 44 1/2".....90.00 45".....91.00 45 1/2".....92.00 46".....93.00 46 1/2".....94.00 47".....95.00 47 1/2".....96.00 48".....97.00 48 1/2".....98.00 49".....99.00 49 1/2".....100.00

Regardless of the abnormal high prices of material and labor, list prices are unchanged. Selling prices necessarily are advanced to meet conditions ranging from list prices as set up to 50% advance over list based upon cost of material.

Full line of ventilators, gasoline and bilge pumps, horns, whistles, strainers and outboard connections shown in New Catalogue "R." Ready in near future, free on request.

A. B. SANDS & SON COMPANY

Largest Manufacturers in the World MARINE PLUMBING SPECIALISTS 22-24 Vesey St., New York, U. S. A.

1849—"SIXTY-EIGHT YEARS OF QUALITY"—1917

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VIPER
Reg. U. S. Pat. Off.

SEA SLED
Reg. U. S. Pat. Off.

VIPER SEA SLED

HICKMAN PATENTS



Latest Type Sea Sleds for Aviation Division, United States Army

Able, seaworthy boats, designed for rescue work in open water.

Length, 28 feet. Weight on trials, 7800 pounds.

Two six-cylinder 6" x 6" engines

GUARANTEED SPEED, 35 STATUTE MILES PER HOUR

Speed Shown on Official Trials, 43.54 Statute Miles Per Hour

Run from Gloucester to Boston, 28 miles, 18 miles of which is open water, in a stiff chop. Army officials aboard. Revolutions, 1200. Time, 48 minutes.

INCOMPARABLY THE FINEST SEA BOATS IN THE WORLD

MURRAY & TREGURTHA CO.

340 West First Street
South Boston, Mass.

THE VIPER CO., Ltd.

Pictou, Nova Scotia
Canada

"GENE" V BOAT CO.

SPECIALIZE 4 QUALITIES

Plain, Regular, Semi-Deluxe, Deluxe

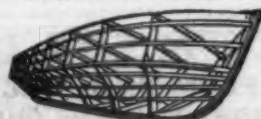
We build any kind of Cruisers, House Boats, Work Boats, Fast Passenger Boats, Runabouts, Speed Boats, Shoal Boats, Row Boats. Also furnish same **SEMI-ERECTED, KNOCKED-DOWN** and **PLANKED HULLS**.

311 Main St., Cincinnati, Ohio

"Ace," 12 h. p., 22 miles per hour guaranteed. This boat is built of genuine mahogany. Photograph was taken just before it left our factory for the Virginia Coast.



"Dum Dum," a military "Gene" V Sea Runabout recently shipped to the coast of Maine.



A "Gene" V Semi-Erected K-D Frame



"High Ball II," 32 feet, 18 h. p., Red Wing, guaranteed 10 miles per hour. Photograph taken on her trial trip to her owner at Huntington



A "Gene" V Planked Hull crated ready for shipment.

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Dependable Spark Plugs

Get Rid of the Cold Weather Starting Problem



With Champion Priming Plugs in your motor you have nothing to fear from cold weather.

Simply open the needle valve on the side of the plug and pour in a few drops of gasoline. It flows right to the sparking points. Then shut the needle valve and give your motor a quarter turn.

It starts immediately.

It's very simple—and you save yourself a world of trouble.

These Champion Priming Plugs are genuine dependable Champion Spark Plugs—with the addition of the priming device.

A key lock attached to the needle valve makes opening and closing very easy. And you cannot lose the key. It is fastened on.

Put a set of these priming plugs in your motor today and get rid of the cold weather starting problem.

Your dealer has them—and they are backed, like all other Champion Plugs, by our iron clad guarantee.

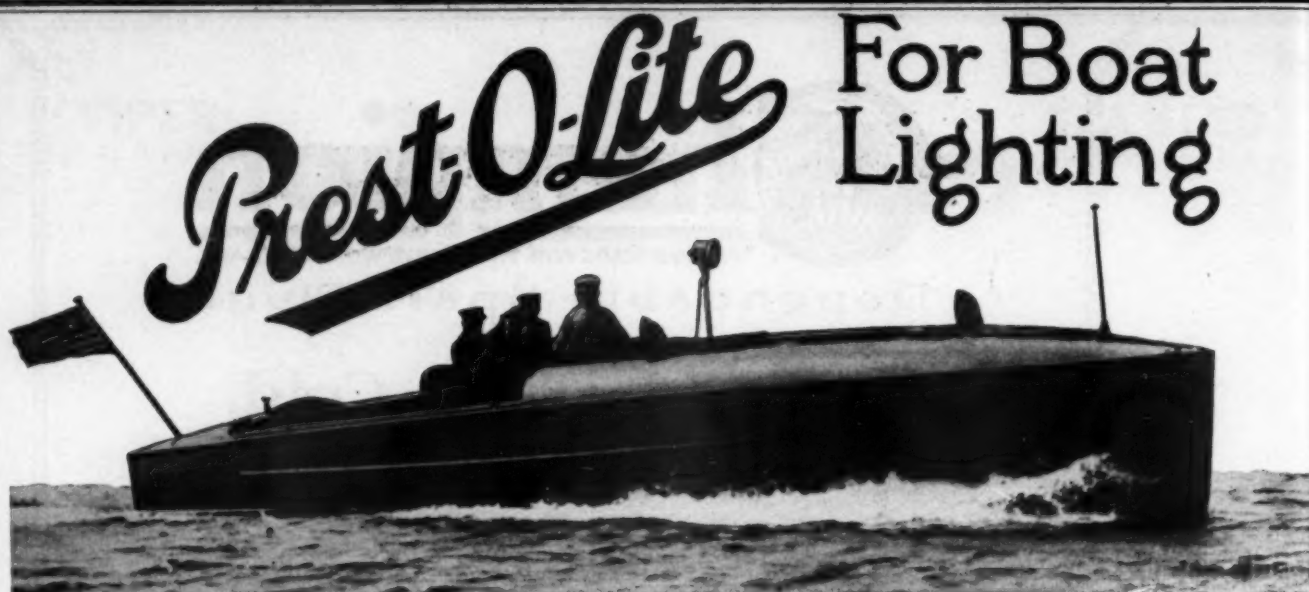
The Champion Guarantee

Complete satisfaction to user, or free replacement, repair or your money back.

**Champion Spark Plug Company, 3003 Upton Ave.
Toledo, Ohio**



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Nothing is so important to the successful operation of the electric starting and lighting system on your boat as its storage battery. In fact, the battery is the very heart of the system.

If you are to get real service and satisfaction from that system, it will pay you to see that your storage battery is reliable and efficient and that it is backed by a service you can use—when you need it and as often as you need it. For the best of batteries need the best of service.

Get a battery that will insure you this service—

Prest-O-Lite Storage Battery For Your Electric System

Not only is this a better storage battery—it has proved its superiority over other types through long periods of hard service—but it is backed by Prest-O-Lite Service which gives you expert battery service through the many Prest-O-Lite service stations and direct factory branches located throughout the country.

Let us send you full particulars regarding this better battery and the service back of it.

Makes Motor Starting Quick and Easy

Prime your engine with acetylene, from the same tank that furnishes you lights, by means of the Prest-O-Primer. This is one of the easiest, quickest and most economical ways to start a cold engine of any size. Send for special folder.

No boat is so small or large that it cannot be fitted throughout quickly and at low cost for the use of Prest-O-Lite Dissolved Acetylene.

Its use on your boat provides many decided advantages. It is perfectly simple, easily understood and operated, and has proven its dependability and economy through years of satisfactory service.

Many of America's best pleasure boats are using it today. Your boat can be inexpensively equipped throughout with

Prest-O-Lite Acetylene Lighting For Your Gas System

It furnishes an abundance of light for all purposes—for searchlight, cabin and signal lights. Also easily used with various appliances, which we furnish at small cost, for cooking and engine priming. In addition, Prest-O-Lite acetylene provides a quick, low-cost means of effecting soldering and brazing repairs on your boat.

Complete information on any or all of these points sent free.

Every boat owner, builder or buyer will be interested in our literature describing fully the Prest-O-Lite Battery and Prest-O-Lite Acetylene. Send for either, or both—free on request.

The Prest-O-Lite Co., Inc.

The World's Largest Makers of Dissolved Acetylene

U. S. Main Office and Factory:

260 Speedway, Indianapolis, Ind.

Canadian Office and Factory: Merriton, Ontario

53 Branches and Charging Plants

Backed by Prest-O-Lite Service

THE pleasures of motoring are greatly increased by the "More Power" added to your motor from the use of "THAT GOOD GULF GASOLINE"—A very clean, non-carbon, powerful gasoline manufactured from selected high-grade crude petroleum especially for the automobile trade.

"More Power" means more mileage—at a lesser cost—at a lesser strain upon your motor—and a consequent saving on the general up-keep of your machine.

Put That Good Gulf Gasoline in your tank and feel the exhilaration of "More Power" in your motor.



There is MORE POWER in
THAT GOOD GULF GASOLINE
AND SUPREME AUTO OIL

*Look for the Sign
Of the Orange Disc*

GULF
REFINING
COMPANY

SUPREME AUTO OIL

Leaves less carbon in the cylinders for the reason that it contains no gum or sticky substance, such as paraffine, to collect and hold the free carbon.

GULF REFINING COMPANY

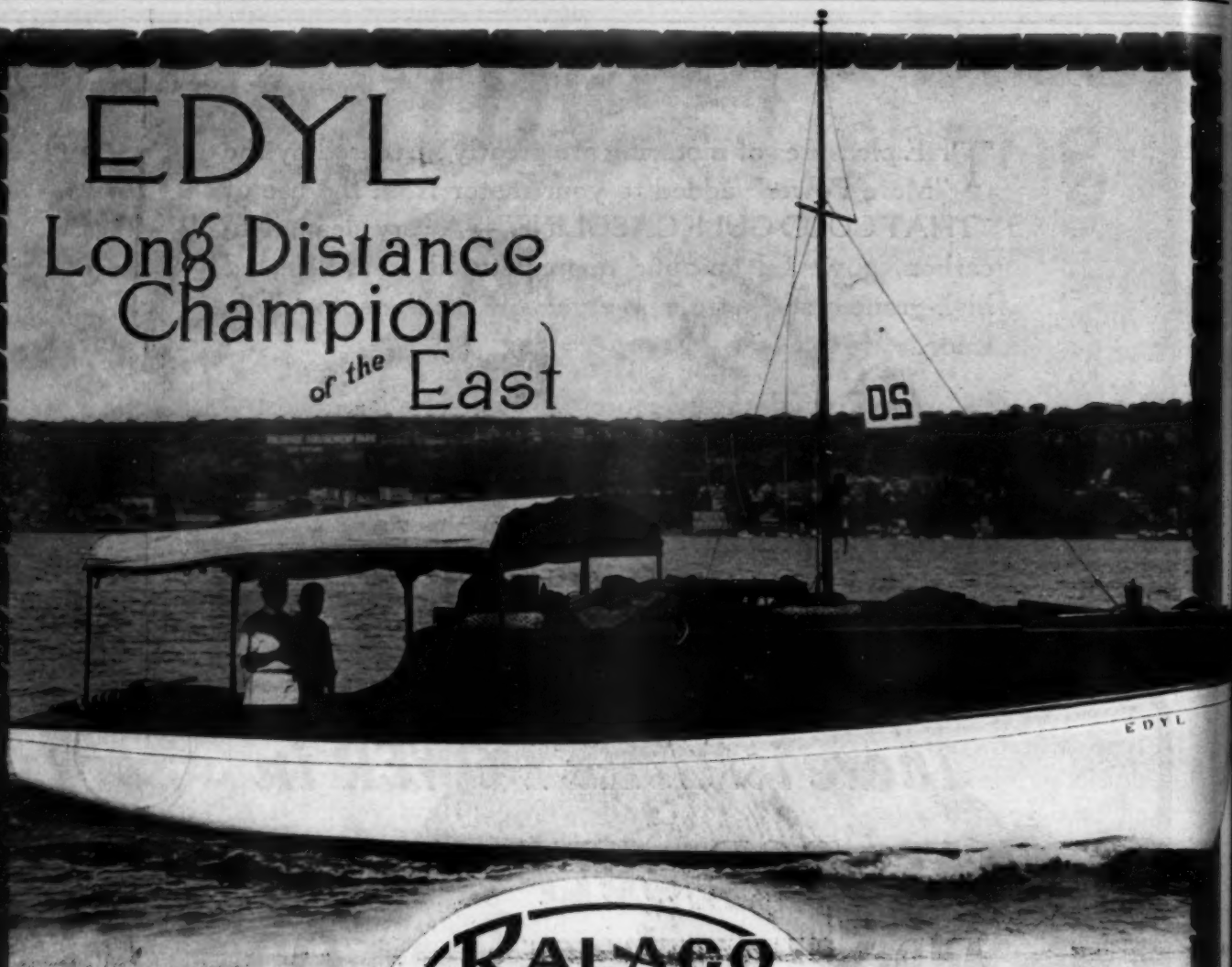
General Sales Offices: Pittsburgh, Pa., U. S. A.

DISTRICT SALES OFFICES:

New York Philadelphia Boston Atlanta Tampa New Orleans Houston

EDYL

Long Distance Champion of the East



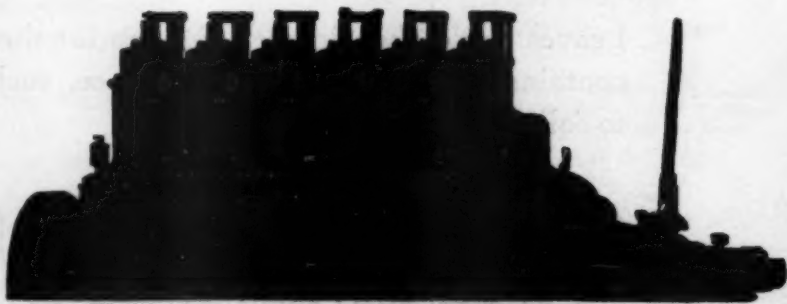
Edyl is the kind of a boat we are proud to say is equipped with a Ralaco engine. A common-sense comfortable boat,—quiet, unassuming, and more reliable than any speed boat ever built.

Edyl won every important long distance cruiser race of the year in the East. She won the A. P. B. A. Certificate awarded for the Handicap Cruiser Championship of the Hudson River, and a similar certificate for the championship of Long Island Sound.

Ralaco Engines are the most economical power plants ever built. They are guaranteed to develop their rated power on one-tenth of a gallon of fuel per horse power per hour. A 10 H.P. will run one hour on one gallon of gasoline or less. Most Ralacos use less than the guaranteed fuel consumption.

For economy, durability and reliability, Ralaco Engines have no competition. One to seventy-five horse power. Four-cycle heavy duty type.


In the 270-mile New York to Albany and Return Race, Edyl consumed just 29 gallons of gasoline. The boat which established the express cruiser record for this race consumed *nearly ten times as many gallons of fuel*. Edyl has a 2-cyl. 8-10 H.P. Ralaco engine.



The Six Cylinder 7 x 9" Ralaco Engine.

Write today for catalog.

The S. M. Jones Company, 616 Segur Ave.
TOLEDO, OHIO



The Storm Finally Stopped But the Engine Kept Going

Out of the northeast swept a gale across Chesapeake Bay. Under its lash great waves rose and fell, tossing as if it were but a piece of driftwood, a small cabin cruiser in which John Burgess, of Baltimore, and four companions were making for the Virginia shore.

It was late in the afternoon when the storm arose. At daybreak it had spent its fury. All night long, with the seas constantly breaking over them and battering their boat, Mr. Burgess and his fellow passengers battled for their lives. Standing ankle-deep in water, they bailed desperately to keep from sinking.

In this crisis, the Ferro Engine—a 17 h.p. two-cycle model—never missed once. To its faithfulness more than to anything else Mr. Burgess ascribes the saving of the party from perishing.

"The way the Ferro Engine stood the test in this severe storm was wonderful," writes Mr. Burgess. "It never missed once, but how it ever stood up under the strain I don't know."

Ferro Reliability in Every Ferro Model

There are 14 to select from, four-cycle and two-cycle, with from 3 h.p. to 50 h.p. All two-cycle models burn gasoline or kerosene. For rowboats, the Ferro Detachable Motor. Write for catalog today and state kind and size of boat.

THE FERRO MACHINE & FOUNDRY CO.
110 Hubbard Avenue Cleveland, Ohio

MARINE ENGINES
FERRO

Guaranteed
Reliable
After
Years of Service



1917 + A Gray "F"
 = Motor Contentment

Four Cycle.

Four Cylinders.

Bore 3".

Stroke 4".

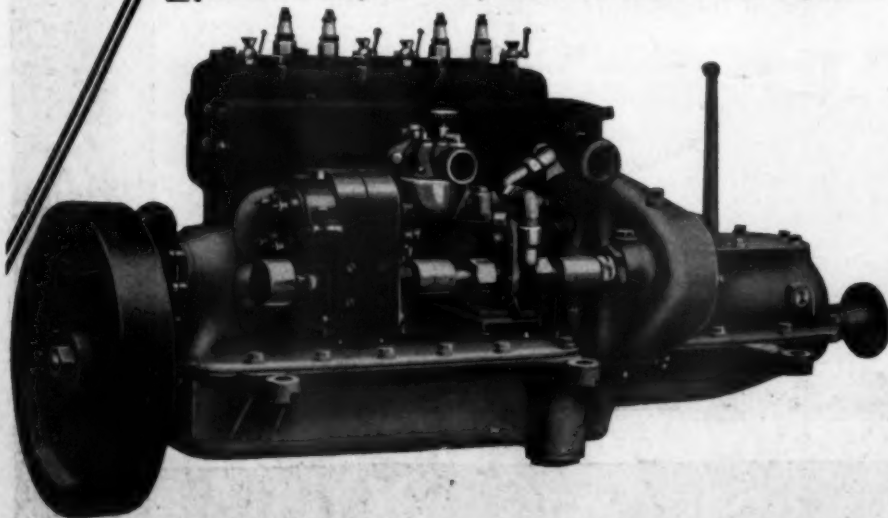
12-15 H. P.

Weight, with reverse gear, 440 lbs.

A Happy New Year

will be yours all through 1917 if you install a Model "F" in your boat. They're bringing true motor delight to new owners every day. Why not to you, too? Power? Lots of it; 12 good, honest horsepower every 1000 R. P. M. (conservative) and better than 15 at 1300. Quality? Right there in company with the highest priced automobile motors. Economy? Fuel consumption so low it will astonish you when we write you the actual facts. Reliability? Has a record to be proud of. Built for endurance and severe conditions. Crankshaft $2\frac{1}{8}$ inches in diameter. All bearings oversize. Lubrication automatic through crankshaft under pressure. Price? So moderate that you will be surprised. Delivery? At once or whenever you desire, if you order before January 15th. Can't promise after that.

☐ There's a Gray for Every Boat—11 sizes—2 and 4-cycle—3 to 90 H.P.



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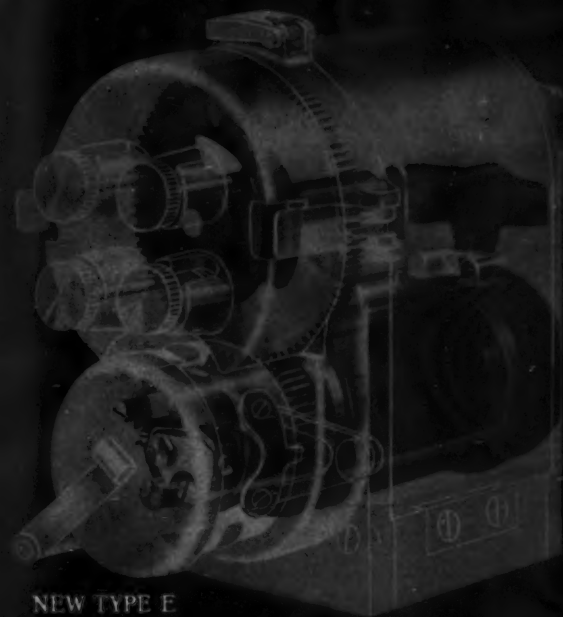
"F"

GRAY MOTOR CO.,

136 GRAY MOTOR
BUILDING,

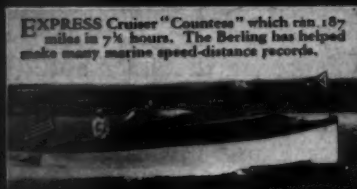
DETROIT, MICH.

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Worth
moreDoes
more

NEW TYPE E

Holder of World's most remarkable records



EXPRESS Cruiser "Countess" which ran 187 miles in 7 1/4 hours. The Berling has helped make many marine speed-distance records.



MOST of the aerial records for speed, distance and height — have been made with Berling Magneto.

Berling Magneto

Why This Is 1917's Greatest Magneto

Like its big brothers — this, the new "E-41" magneto, is thoroughly enclosed and waterproof. The parts are easily adjustable — and removable without the use of tools.

The distributor finger is self-cleaning. Danger of carbon is at a minimum.

The interrupter is the same as used

on the big Berlings, which have given this magneto full right to the claim — "Holder of the world's most remarkable records."

This E-41 type can be had in either independent or dual type. Deliveries can be made immediately.

See our exhibit at the Motor-boat Show.

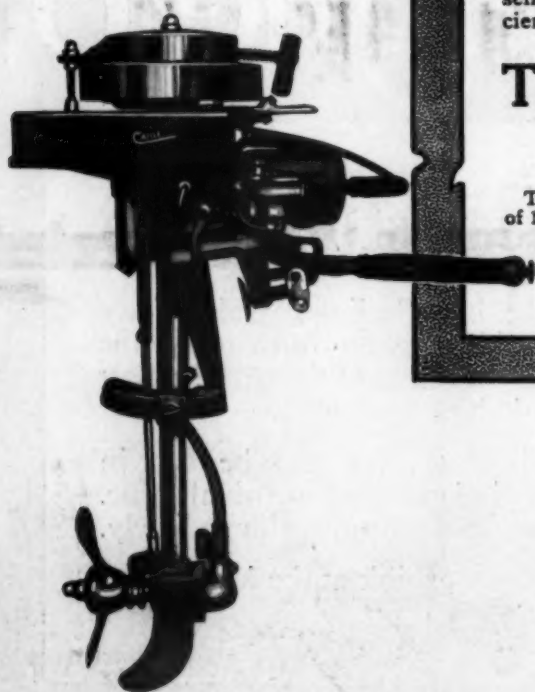
Ericsson Manufacturing Company
1110-1140 Military Road, Buffalo, N.Y., U.S.A.

CAILLE

Perfection Motors

Specifications of the Caille 5-speed Motor

Five speeds—two forward,
two reverse and neutral
Improved cooling system
Self-lubricating
Weedless propeller
Water-tight glass
Press the button to change
speed; press another to
stop motor
Efficient Silencer
Waterproof Magneto in Fly
Wheel
Cushioned Tiller
Speed—1 to 10 miles per
hour
Dual Ignition



OUTBOARD MOTORS

Here's the rowboat motor with distinctive features—features that have made it easily the most popular in the field. You'll be proud to own one.

THE Caille 5-speed motor has revolutionized that great American pleasure—motor boating. It has brought a world of fun to thousands.

The little, though important perfections have lifted it clear of the "Kicker" class. It possesses that same high standard of quality—both in design and manufacture—that marks the Caille Inboard Motors.

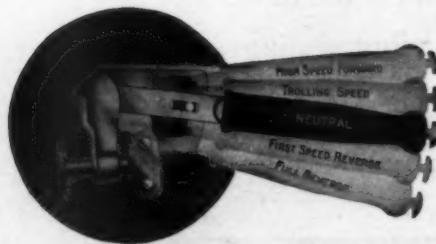
The convenience of the one-hand (5-speed) control is at once apparent. It means unthought-of flexibility, safety and fun. And there's no back-breaking cranking. Just give a snap to the starting-strap and away you go. Children run this motor as easily as they ride bicycles.

The tiller is provided with a big, rubber handle. The High Tension Magneto (water proof) is a part of the fly wheel. The muffler actually muffles—the propeller is semi-weedless, the lubrication system is especially efficient and there's an always dependable cooling system.

The Caille Bantam Motors

For Your Canoe

This little well-built 2 H.P. inboard motor develops a speed of 10 to 15 miles per hour. Designed especially for featherweight canoes. It has a surprising flexibility. Runs smoothly and quietly and develops ample power to carry you most any place.



The Caille Perfection Motor Company

CAILLE

Perfection Motors

INBOARD MOTORS

Let your choice of a new motor be governed not by names, not by pictures, but by the service it gives under just the kind of work you'll give it.

YEARS of service has proved the built-in quality of Caille Perfection Motors. They're constructed to give uninterrupted service under conditions even more severe than they are ever put to.

Caille dominance is accepted—not merely because we've been leaders in the manufacture of marine motors for years—not because the specifications are unusually complete—not because Caille motors are attractive to the eye, but because of that always-final test of utter dependability in the hands of users.

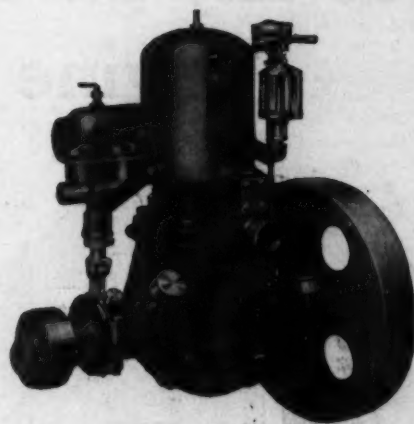
The Caille line is complete up to 30 H.P. We build just the motor you need, whether it be for work or for fun. Racing models can be constructed with aluminum crank cases—open boat motors with our Perfection Waterproof Igniter and we've special heavy duty types for work and fishing boats.

We'll Help You Decide

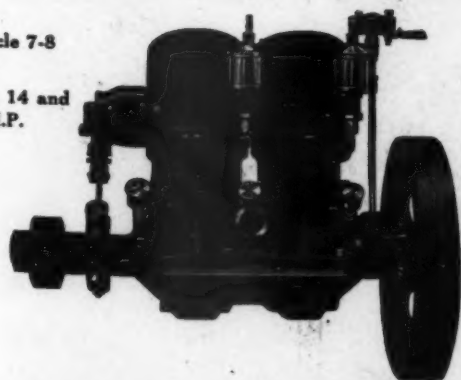
Thousands of satisfied Caille users are pleased not entirely because their motors are dependable, but also because they bought the proper type and size for their particular needs—at the suggestion of our Marine Engineering Department. We want you also to take advantage of their service. Their experience extends over many years and they will give you unprejudiced recommendations regarding your problems. If there's a Caille motor to fit your needs, they will name it—if there isn't they will tell you.

Why not give us the following information now? You may not need your motor immediately, but it's well to plan well in advance. Length of hull? Width of hull? Draft? Work or pleasure? If for pleasure, what speed is desired? If for work, what is approximate maximum load? The more completely you inform us, the more intelligent will be our advice.

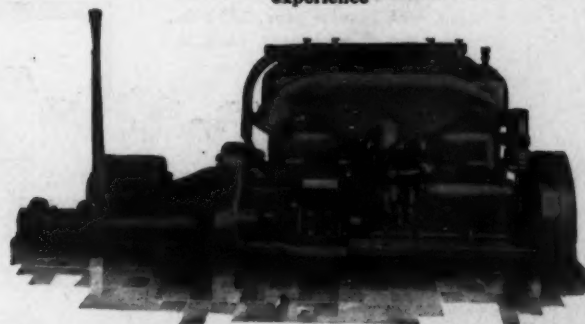
Catalog No. 24 is interesting as well as instructive. You'll not be obligated by asking for it.



Caille 2 cycle, 8 H. P.
Heavy Duty Motor
Also made in 2, 2½, 4 and 6 H.P.



Caille 2 cycle 7-8
H.P.
Also made in 14 and
18-20 H.P.



Caille "Aristocrat"
4 cylinder, 4 cycle—14 H.P.
The masterpiece of our years of
experience

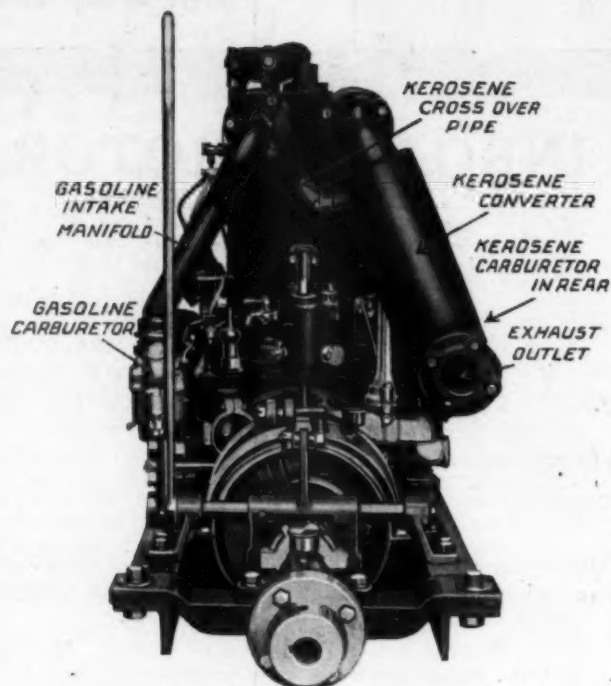
100 Baltimore Ave., West, Detroit, Michigan

Also makers of the popular Caille Five-speed motor for Towboats. Catalog No. 10 describes it—send for it if interested.



**This Motor runs
on Kerosene
as dependably
as any gasoline
engine**

**VALVE-
IN-
HEAD**

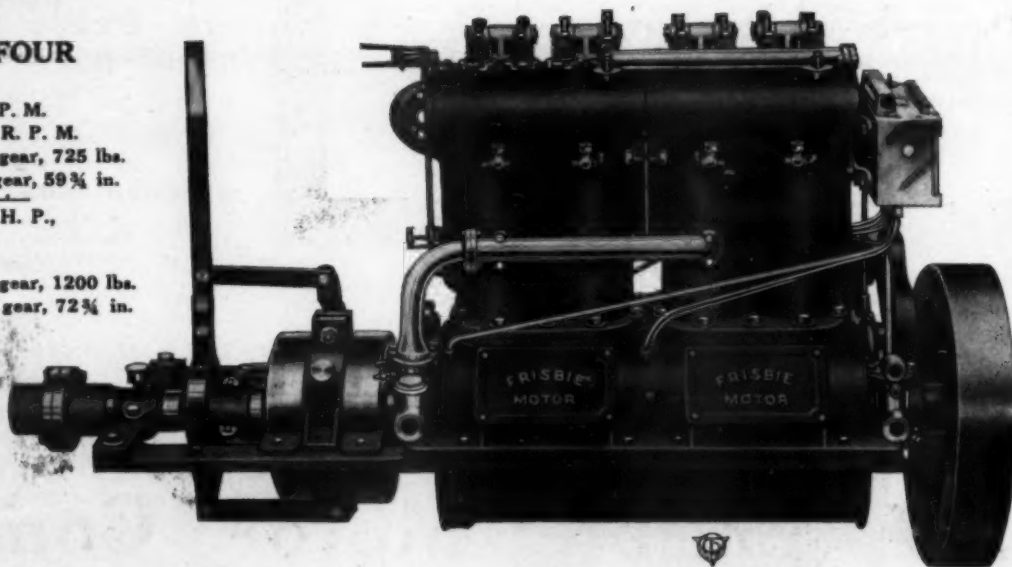


End View of Frisbie Kerosene Motor, showing the separate manifolds and carburetors on opposite sides. 3 cyl., 18-25 H. P., 6" x 6" bore and stroke.

FRISBIE FOUR

20-30 H. P.
Speed, 600 to 800 R. P. M.
Minimum Speed, 150 R. P. M.
Weight, with reverse gear, 725 lbs.
Length, with reverse gear, 59 3/4 in.

Same design—30-40 H. P.,
650 R. P. M.
150 minimum speed.
Weight, with reverse gear, 1200 lbs.
Length over all, with gear, 72 3/4 in.





"Is the Gas turned on?"

Did you ever want to turn your boat into a submarine and sink the whole party because, after you had been trying for half an hour to cajole a sulky motor, some fool guest suggested helpfully, "Is the gas turned on?"

There's just one of two courses to pursue—either give up motor boating or get a good engine.

Now it's no use to go into the mechanics of it in this limited space and try to tell you why the Frisbie is the most efficient marine engine that ever won the heart of motor boat fan. We could write a book about the valve-in-head feature alone. You could spend a day in our factory studying the refinements of our shop practice—the infinite pains put into every operation—our scientific method of selecting materials—the conscientious way we test and work out every engine until we *know* it will perform up to the Frisbie standard.

So we will let it go this way:

The Frisbie comes to you ready to run and it keeps running. It's an engine of but one mood—it's always friendly. It never gets sick and querulous. It is never mean. You can depend on it as you do on sails or oars.

And power! Say—it's all right to talk about cylinder capacity and all that—but the actual power you get out of a motor depends on a lot of things you can't measure with a foot rule. The Frisbie *really has power*. It never whines and coughs and quits when you kick in the clutch. It picks up the load with a good virile snap and always has something in reserve when you are racing to the mooring at dusk of a perfect day.

So right now, while you are mulling over the plans for the new boat or refitting the old, write for full details on Frisbie—the friendly motor. One cylinder to six—three horse power to seventy-five.

The Frisbie Motor Company

7 COLLEGE ST., MIDDLETOWN, CONN.



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HYDE

TURBINE TYPE PROPELLER

THE
WHEEL
WITH

THE
RECORD



THE
PROPELLER
USED BY

"Miss Minneapolis"

The Fastest Boat in the World

CATALOGUE FREE UPON REQUEST

HYDE WINDLASS COMPANY

Bath, Maine, U. S. A.

Four Thousand Miles



**Without
One Cent
for Repairs**



THAT is a record in which any boat owner could take justifiable pride. Four thousand miles in one season, without a single adjustment or a single misfire. Ready to start whenever you say—never a moment's delay for tinkering—nothing to do but skim over the water as smoothly as you "burn up" a macadam road in your motor car. It would almost make an old-timer lonesome for trouble.

But then, that's the kind of service you expect when you have a

THE BOAT

MIGNON is our standard Fay & Bowen "Junior" Runabout, 24 ft. x 5 ft., with a guaranteed speed of sixteen miles an hour. The design is thoroughly up-to-date, with attractive lines, comfortable seats, plenty of room, auto type control and engine under hood. White oak frame, clear Southern cypress planking, copper and brass fastened. Beautifully finished in mahogany. Safe, seaworthy and very dry.

FAY & BOWEN ENGINE

Mignon is owned by Mr. John C. Curran, whose summer residence is at Raquette Lake, New York. He wrote us recently,—

"We had her in commission nearly five months, my daughter running her all the time, and averaged about thirty miles a day. The boat must have run a total of about four thousand miles, and during all that time needed no adjustment and never skipped once or cost me one cent for repairs. When I laid her up in the boat-house at the lake for the winter, she was in as fine condition as when we first used her.

"This is, I think, a wonderful record for the distance we ran, using her in all kinds of weather, and certainly proves that your engines are both reliable and efficient."

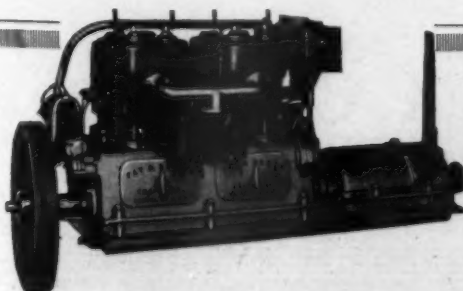
THE ENGINE

The power plant regularly installed in our Junior Runabout is the Fay & Bowen 22 H.P. four-cylinder four-cycle engine, 3½" bore by 5" stroke. It is an ideal motor for a runabout of this size as it is not only fast and powerful but remarkably flexible, and the operating expense is very low. Ignition by Bosch magneto. Salt water fittings throughout. If you already have a good runabout up to 25 ft., consider a new engine of this model for it this season.

You can be assured of complete satisfaction if you buy one of these Junior Runabouts. Perhaps you might prefer one of our larger models. A Fay & Bowen boat, like a Fay & Bowen engine, is built first of all for reliability. We have only one standard of quality.

Let us send you a catalog of Fay & Bowen engines, boats, independent electric lighting units or pumping sets. Simply state your requirements.

"None Better Built"



Fay & Bowen Engine Company

104 Lake Street

Geneva, N. Y., U. S. A.

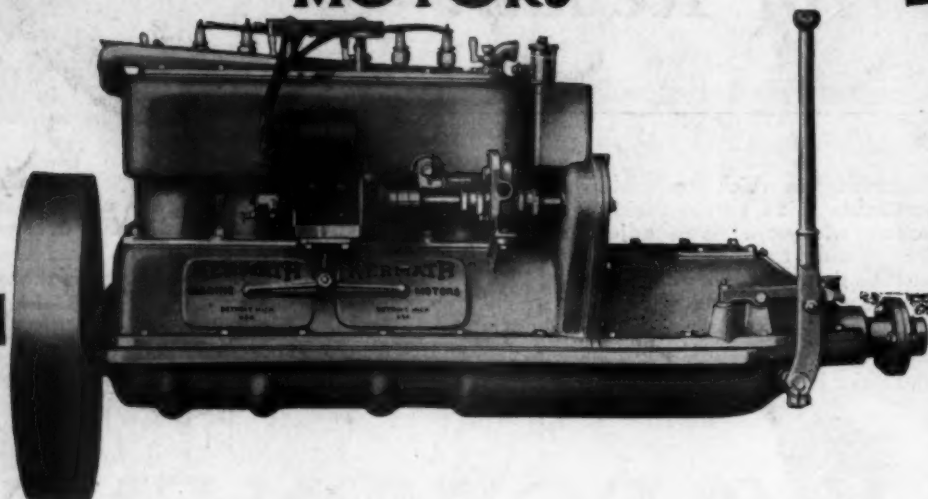
New York Office: 50 Church St., on Concourse, Sutter Bros., Representatives.

Made for Canada by the St. Lawrence Engine Co., Ltd., Brockville, Ont.

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KERMATH

GUARANTEED MOTORS



"There ain't no sech animal"

So said a farmer with his first look at a giraffe.

That's what the motor boat men said, too—in 1911—when the Kermath came on the market at \$150.00 for a "4 cylinder, 4 cycle engine." The price has gone up since "it's true"—with all the rest of the "high cost of loving" (motor boats).

But, men! you don't hear anyone howling about the virtues of 2 cycle engines any more, do you?

Certainly—all the old makers have turned to 4 cycle lines.

There's competition—plenty of it—Thank Goodness for it. If we had things all our own way, as at first, we would have gotten stale—**But We Led Then as "We Do Now."** Why? Because we are boat men ourselves. We know what a man wants and we're out to make it for him. We have refined our engines so that for 1917 they are 1000% better (naturally) than they were 7 years ago, and about the same amount better than most engines we know of in these sizes.

Why are they better?

Why are some children better than others?

Because they have been brought up better—

And Kermath Engines have been brought up better.

They have had One Factory—One Organization—One Idea—
One Aim—All Concentrated on One Design and Type.

Why shouldn't they be better?

No other engine in the entire world has had this advantage.

Get one and have the full pleasure of boating.

KERMATH MANUFACTURING COMPANY
Department 2 DETROIT, MICHIGAN

